WATER AND SEWER FINANCING IN ONTARIO

ISSUES AND OPTIONS

FINAL REPORT

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Report prepared for :
MOE Fiscal Planning And Economic Analysis
Ontario Ministry of the Environment

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ISSUES AND OPTIONS
FINAL REPORT

Report prepared for:

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Ontario Ministry of the Environment

In consultation with

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EXECUTIVE SUMMARY

Background and Purpose

Ontario municipalities reported expenditures on water and sewer services totalling almost $1.6 billion in 1987 (the most recent year for which accurate information is available). This figure consists of approximately $461 million in capital fund expenditures and $1.1 billion in revenue fund expenditures. As increasingly strict environmental regulations come into effect, and the federal and provincial governments continue their fiscal retrenchment, municipalities in Ontario will likely be spending even larger sums in the future.

Meeting these expenditures in the most efficient, effective and equitable way has become a concern for all levels of government, as fiscal restrictions become more pronounced. In particular, much attention has been focused on innovative financing approaches, especially those that are designed on the principal of "beneficiary-pays". The underlying notions of this principle are that expenditures should not exceed resulting benefits, and that the beneficiaries of a public service should contribute to the defrayal of related costs in proportion to the benefit they receive.

In Ontario, a variety of financing methods are employed to cover the capital and operating costs of water and sewer services. There has been some concern that current methods of revenue generation may not be adequate. This study discusses the benefits and costs associated with water and sewer services, the beneficiary-pays principle, and important considerations in evaluating financing options, and examines the current state of water and sewer financing in Ontario, through development of a water and sewer finance database, and through six case studies of representative jurisdictions in the Province.

The purpose of this study is to examine the current state of municipal finance in Ontario with respect to the financing of water and sewer infrastructure and to identify approaches to financing water and sewers which may be applicable in the Province. Two questions of particular interest to this study are, whether municipalities are generally able to meet their expenditure needs, and to what extent users and beneficiaries are bearing the costs of water and sewer services.

Findings

Water and sewer services may be financed through a variety of mechanisms, ranging from general tax or tax-like charges to user- or beneficiary-based charges. Innovative financing is predicated upon a shift away from reliance on general government revenues or subsidization and towards "responsible fiscal practices", which generally include full-cost pricing and recovery of costs through dedicated service fees.

While it is generally agreed that beneficiaries should pay in proportion to the benefit they receive, the question of who benefits from water and sewer services, and to what extent, is not so simple.

The immediate beneficiaries are obvious. They are the direct recipients of the services. The availability of water and sewage treatment services enables local residents to live in greater comfort than would otherwise be possible. These services also enable the local residents to benefit from the fact that other activities can take place in close proximity, e.g. the growth of towns, the location of industries, etc.

However, there are also indirect beneficiaries. The population of an entire region benefits from the provision of local water and sewer services in that communicable diseases are prevented and various forms of physical and aesthetic pollution are mitigated. By extension, the entire province, and indeed the country, benefits from the provision of these services. Similarly, one region of high growth may benefit from the installation of water and sewage services in another slow-growth area if the pressure of growth is relieved. These kinds of arguments apply within cities, regions and whole Provinces, and suggest that there may be roles for all levels of government in financing the provision of water and sewer services. The degree of involvement would be proportional to the benefits derived, with "benefits" being interpreted liberally to include contributions to the advancement of various policy objectives such as distribution of growth, the achievement of local or international pollution abatement objectives, prevention of disease, stimulation of employment growth, etc.

From the beneficiary-pays perspective, water and sewer rates and development charges are "good" financing options, and property taxes and grants are less "good". Debt financing may also be supported by the beneficiary-pays principle. The capital works have a long life-span, and it is appropriate that the costs of the works be shared over time by users, through rates based on an amortization schedule (i.e. through rates based on a blend of capital repayments and interest charges).

The six case studies conducted indicate that, while municipalities may be decreasing their use of debt financing, they are not relying heavily on general revenues to finance water and sewer services.

All of the case study municipalities have adopted what they refer to as a "pay-as-you-go" approach. By this they mean the financing of capital expenditures largely through the accumulation of revenue in capital reserve funds. Some municipal representatives defend this form of pay-as-you-go approach as preferable to debt-financing. In their view, this approach has current users paying for future benefits, and, in turn, benefitting from past payments made by others. Reserve funds avoid some of the difficulties and dangers of debt-financing, and encourage long-term planning. In fact, the case studies conducted for this study show that municipalities using this form of pay-as-you-go approach apply complex long-term capital budgeting to manage their water and sewer systems.

The case studies conducted indicate that users and beneficiaries are shouldering a large portion of the costs of water and sewer services. Even in cases that appear inefficient because of the use of general tax revenue, such a situation arises, not because of a lack of knowledge or consideration of economic efficiency or equitability, but precisely because factors other than strict adherence to user-pay systems are weighed in devising an appropriate financing scheme.

The use of Provincial grants in providing these services may also be appropriate. Grants can be an important means by which indirect beneficiaries contribute to the costs of water and sewer services. Smaller jurisdictions such as Muskoka and Arnprior may not be able, on their own, to afford the large capital expenditures necessary to provide adequate water and sewer services, because they lack either sufficient population or sufficient density of development (or both). However, other communities, and arguably the rest of the Province and the whole country, benefit from a high level of water and sewer services in smaller jurisdictions and remote areas. Protection from disease, the prevention of physical and aesthetic pollution, the high degree of mobility that is afforded people, and the sustainability of communities outside of major urban centres benefit the population as a whole.

Conclusions

The conclusions of this study are as follows:

1) There are benefits beyond those that accrue to the direct users of water and sewer services, and therefor, it may be appropriate for all levels of government, including the federal government, to contribute to the costs of providing these services;

2) In the case studies examined, users and beneficiaries are currently paying a major share of the costs of water and sewer services, with only a limited reliance, in some cases, on general revenue sources;

3) It is not at all clear that there is a need for a dramatic shift to innovative financing methods for water and sewer services, at least in the case study municipalities examined. While there is insufficient evidence to apply this conclusion across all of Ontario's municipalities, in the case study jurisdictions, the financing methods applied appear to suit each municipality, and in many cases are based on sophisticated, long-term capital budgeting approaches.

   Nonetheless, there is anecdotal evidence that suggests Ontario municipalities would benefit from assistance in determining what financing mechanisms are available and practicable, and in determining the most appropriate financing mechanisms for their particular circumstances; and

4) The statements of municipal representatives suggest that there is no general concern among the case study municipalities about their ability to meet future water and sewer expenditure needs. As above, we note that these conclusions may not be applicable to all Ontario municipalities.

Background

Public works provide essential, but often unappreciated services. In the case of water and sewer services, water is supplied and waste removed, but the public more often considers these to be rights than services with associated costs. This situation has prevailed, in part, because of the perception of utilities as being beyond normal economic principles, in that they are associated more with the realm of government than with that of business. Yet the truth is that Ontario and its municipalities have invested billions of dollars in water and sewer infrastructure, and the rehabilitation, enhancement and expansion of these services will cost further millions each year.

The challenge for Ontario's municipalities, which face increasingly tight fiscal circumstances, is to continue to provide a high level of service which meets the demands of growth and rehabilitation, and to cover the cost of this service by charging users in an equitable and efficient way.

The economically justified solution, it seems, would be to have those who benefit from water and sewer services pay for them in proportion to how much they benefit. However, determining who benefits, and how much, is often not a simple matter, and one has to consider not only current operating and maintenance costs, but also the financing of large capital expenditures, which must be spread out over many years. It is capital financing that is of particular concern to municipalities and the Province, because of the need for significant spending on water and sewer infrastructure in the coming years.

The Ontario Ministry of the Environment has undertaken this study in order to identify new methods for municipalities and the Ontario Government to finance water and sewer infrastructure. A brief outline of the purpose of this study follows.

Purpose

The purpose of this study is to examine the current state of municipal finance in Ontario with respect to the financing of water and sewer infrastructure and to identify approaches to financing water and sewers which may be applicable in the Province.

The specific objectives of the study were to:

- identify beneficiaries of sewage and water infrastructure;
- discuss the benefits arising from water and sewer service, and determine whether current financing and administrative arrangements reflect these benefits;
- examine alternative financing and administrative arrangements for sewer and water works that could be adopted by the Province and/or municipalities;
- identify criteria relevant to evaluating the above structures; and,
- examine and evaluate the financing methods of six representative municipalities in Ontario.

Methodology

The research for this project was divided into four major task areas, as follows:

1. *Description of the Water and Sewer Infrastructure in Ontario*

   An analysis of investment trends in water and sewage infrastructure in the Province; a description and evaluation of the current water and sewage administration and financing arrangements in the Province; and, the conduct of a set of case studies of a set of Ontario municipalities.

2. *Identifying Beneficiaries and Allocating Benefits*

   An analysis of the principle of "beneficiaries pay" and its implications for the most appropriate methods of funding and paying for these services.

3. *Optional Approaches To Financing Water And Sewer Services*

   The identification, and discussion of approaches being taken by comparable jurisdictions to financing these types of infrastructure.

4. *Preparation of a Database on Municipal Finance in Ontario*

   The creation of a database on municipal water and sewer finance, built from the MARS (Municipal Analysis and Retrieval System) database maintained by the Ministry of Municipal Affairs.

Report Format

The remainder of this report consists of six sections.

Section III - *Overview of the Delivery of Water and Sewer Services in Ontario*

- Describes the historical evolution of the current arrangements for the delivery of water supply and sewage collection and treatment services in Ontario.
- Describes the various methods used by Ontario municipalities to pay the operating and capital costs of these services.

Section IV - *Financing Water and Sewer Services in Ontario*

- Discusses trends in municipal financing of these services over the last ten years in Ontario.
- Presents objectives and criteria that must be considered in choosing among financing and charging arrangements

Section V - *The Benefits And Costs Associated With Water and Sewer Services*

- Discusses the economic concept of "beneficiary pays" and leads to suggestions of the most economically-efficient approach to funding and paying for these services.

Section VI - *Innovative Finance and Experience in Other Jurisdictions*

- Discusses the various approaches to these problems being adopted by municipalities. Some of these methods are or could be adopted by Ontario municipalities; others would require legislative or regulatory changes.

Section VII - *Evaluating Financing and Administrative Arrangements*

- Discusses objectives and criteria considered in the evaluation of financing and administrative arrangements.

Section VIII - *Summary of Findings and Conclusions*

- Presents brief discussions of the findings identified in the report and conclusions drawn.

Historical Perspective

This section provides an historical review of the provision of water and sewer services in Ontario, and an overview of the current ownership and operation of facilities.

Each of the water and sewer systems in Ontario has a distinct history, often rooted in 19th century efforts to provide sewage disposal and fresh water to the province's various communities. The current state of water and sewer infrastructures is the result of efforts since the turn of the century to coordinate, and make safe and reliable, the provision of sewage disposal and water delivery services.

Ontario's remarkable endowment of fresh water has been a prominent factor in its growth and economic success. In addition to supporting valuable habitats and species, Ontario's lakes and rivers provide drinking water, allow the generation of cheap electricity, facilitate transportation and aid in the disposal of wastes. As the towns and cities of Ontario grew, adequate drinking water and sewage disposal infrastructures became essential to continued development. Larger, more sophisticated systems had to be built, not only to meet the need of greater capacity for water delivery and waste removal, but also to coordinate and augment these services in order to protect against virulent water-borne diseases, such as typhoid.

In the late 1800s, most of Ontario's smaller communities took drinking water from wells and disposed of slops and waste in privies. These privies were emptied periodically, and their contents used as fertilizer or left to decompose.

In larger communities, drinking water was usually drawn from surface sources, i.e. lakes and rivers, and properly constructed sewers were considered the best means for disposing of sewage. However, municipalities did not always use the system best suited to their circumstances. Sewers and drains were often built improperly and water-closets and cesspools were connected to drains unfit to receive and carry away the contents; drains opened into houses and sewage gases were not properly ventilated; sewers were not laid to proper grade and had to be flushed; many sewers were, in fact, underground cesspools.[1]

By the end of the 1800s, proper water and sewer systems had become more common. Large municipalities expanded their systems and other communities, as they grew, built their own. Many more Ontarians had access to water and sewer services, but they were also exposed to dangers associated with the disposal of sewage.

At the turn of the century, sewage treatment in Ontario consisted mainly of dilution of the effluent from sewer outflow pipes. It was expected that bacteria would decompose the organic matter in the sewage as it dispersed into the receiving waters. However, sewage often emptied into the same body of water from which drinking water was taken. In Sarnia, for example, the sewage outfall and drinking water intake were only 150 feet apart, and in at least one Ontario community, the sewage outfall was located just upstream from the raw water intake. (Davey, p.9).

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[1] Tom Davey. Recollections, Water Pollution Control in Ontario. (Pollution Control Association of Ontario, 1985), p. 8.

Between 1903 and 1913, the number of deaths from typhoid averaged 24.4 per 100,000 people each year in Ontario, considerably higher than the prevailing rate in Europe. To prevent the spread of the disease, the Ontario Board of Health was given the authority to approve all sewers and water mains. It became apparent that for many of the communities in Ontario, it was necessary to treat both drinking water and sewage. During the first half of this century, chlorination came to be used extensively to disinfect water supplies and various methods of sewage treatment were applied in sewage systems across the province.

The progress in providing safe, reliable and extensive water and sewer services was made despite major hurdles, foremost of which was the matter of financing: how to raise the large initial sum for capital expenditures, and how to finance the ongoing operating and maintenance costs of water and sewer infrastructures. Sometimes an existing water supply main had already been constructed by private interests and individual connections were allowed by private agreement. In other cases, groups of citizens and/or local governments would borrow funds and devise a repayment scheme. This would often involve an initial charge to those who connected to the system and an assessment for ongoing costs against benefitting landowners.

During the depression years and through WWII, infrastructure spending was limited, yet the growth of Ontario's cities and the expansion of industry during and shortly after the war put immense pressure on the Province's water and sewer systems, as well as on the waters which eventually received liquid wastes. A study by the International Joint Commission (IJC) of Great Lakes water quality in the late 1940s indicated that industrial waste had come to represent a greater BOD_5 (5-day biochemical oxygen demand) on receiving waters than the total sewage produced by the study area population of 3.5 million. (Davey p. 19). As a result of rapid industrial growth and limited resources, municipalities found it increasingly difficult to fund new projects or to maintain existing levels of service.

To support municipal water and sewer projects, the Municipal Act, as amended in 1943, allowed municipalities to finance such undertakings by a user rate rather than from taxes. In 1950, the Municipal Improvement Corporation was established to help municipalities borrow money for sanitary works, and in 1956 Ontario created the Ontario Water Resources Commission (OWRC).

The OWRC offered municipalities financing assistance and expert technical help in the planning, construction and operation of works. Municipalities could construct their own facilities or enter into an agreement with the OWRC, whereby the Commission would design, build, finance and operate the facilities. Under the financing plan offered by the Commission, the municipality did not have to issue debentures. Funds were supplied by the Commission and the debt repaid over 30 years in most cases. Payments made by the municipality included operating costs, as well as principle and interest, and at the termination of debt there was provision in the agreement such that, at the request of either party, the works would be turned over to the municipality. (Davey, p. 91).

Further financial assistance for water and sewage works became available to small communities beginning in the late 1960s, in the form of subsidies or grants from the Province. The program encouraged larger scale ventures by offering greater financial assistance for area projects. In general, the OWRC approach was to recognize that a facility, as initially constructed, should be larger than necessary for current population, that it should be designed to provide for a long period of service and that the cost should be borne by those benefitting from the service. Thus, the initial population would not carry the total debt load, but as the population grew (as it was presumed the population would), the additional residents would contribute to the cost of the facility.

Of course, the circumstances which prevailed were not ideal. Some municipalities grew so rapidly they quickly outstripped the capacity of their water and sewer infrastructures, and other municipalities

experienced little or no growth. Whichever the case, the high interest rates and inflation of the 1970s hampered all municipalities paying for costly water and sewer systems.

Regionalization

The move to two tier regional governments throughout Ontario in the 1970s was advocated as a solution to the problems of urban finance. Economies of scale and centralized borrowing can ease the burden on local municipalities of providing such services as water supply, sewage treatment, garbage disposal, road construction and health and social services.

In Ontario the following 12 regional governments were created.

Metropolitan Toronto	(1954, further consolidated in 1967)
Ottawa-Carleton	(1969)
Niagara	(1970)
York	(1971)
District Municipality of Muskoka	(1971)
Waterloo	(1973)
Sudbury	(1973)
Durham	(1973)
Peel	(1974)
Halton	(1974)
Hamilton-Wentworth	(1974)
Haldimand-Norfolk	(1975)[2]

Though it is not clear that regional governments have been generally more efficient or cost effective in providing services than individual local governments, they have assumed the administration of a large amount of the Province's infrastructure. With respect to water and sewer services, often the regional government owns and operates the treatment plants, while local governments own their sewers and water distribution systems. This and other ownership structures are discussed briefly below.

Ownership and Operation

There are five significant ownership structures which currently exist in the Province of Ontario, and in the future there may be a sixth, with a Provincial Crown corporation being owner. These six forms of ownership are described below.

Provincial ownership - The owner in this case is the Ontario Ministry of the Environment, which was established in 1972, and subsumed the responsibilities of the OWRC.

Since 1974 the Ministry of the Environment has been encouraging municipalities to take over the ownership of water and sewage treatment plants. The growth of many municipalities has allowed them to assume full ownership and operations of the facilities.

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[2] Richard Bird and Enid Slack, Urban Public Finance in Canada. (Toronto: Butterworths, 1983).

The Ministry currently owns and operates 153 sewage and 77 water systems for which it recovers costs, capital investment and interest charges. It also operates, for a fee, 80 sewage and 55 water plants owned by municipalities.

Regional Facilities are found in the large Regional Municipalities and supply the needs of the entire Region. Hamilton-Wentworth is an example of a Regional Municipality which owns and operates its sewage treatment plants, water treatment plants, and water and sewage systems. Hamilton-Wentworth's works department owns and operates the systems and reads the meters, while the finance department sets the water and sewer rates and bills the users for their use. Other Regional Municipalities, such as Niagara Region, may own the water and sewage treatment plants and the trunk lines, but not the distribution system. In these cases, the Regional Municipality wholesales water and sewage treatment to its municipalities. In the Regional Municipality of Haldimand-Norfolk, the Province owns the water pipes but not the distribution system.

A potential advantage of a Regional municipality owning and operating water and sewage facilities is that the administrative process can be streamlined. In some cases, economies of scale and central administration can lead to significant gains in efficiency. However, a related aspect of Regional ownership is that the operation of facilities is closely linked to the political process. Politicians have ultimate approval of the budgets of the facilities and may assign priorities to expenditures according to political need.

Local Municipal Facilities are found in municipalities that have not been included in Regional structure of government to date. Local municipalities may own and operate water and sewage treatment plants, or they may only own parts of the system. For example, a public utilities commission could own the water treatment plant, the province could own the sewage treatment plant, and the municipality could own the distribution system. All municipalities across Ontario own their storm sewers.

Public Utility Commission Facilities were initially formed by the Ontario government to administer the local distribution of electric power provided by Ontario Hydro. Every city in the province needed a hydro commission to supply power to the residents. When cities began supplying water to residents, the Hydro Commissions were already set up to administer services throughout a large area. The names of the commissions were then changed to public utilities commissions (PUCs). PUCs were disbanded in areas where regional governments were formed, and now remain only in some of the areas not governed under the regional system.

One advantage of PUCs over other forms of ownership of water facilities is that they operate with an arms length relationship with the municipal government. PUCs are autonomous from the political process and have the power to set water rates at whatever level they deem necessary and collect the revenues. Barrie, London, and Windsor are examples of areas where PUCs own the water treatment systems.

Privately Owned Facilities. In some cases both water and sewage treatment plants are owned privately and provide a domestic service. Historically, these private systems were built when there was no other structure in place to service the area and are often located in rural areas. Some examples of privately owned facilities are high schools, which may have their own water and sewage treatment systems owned by their board of education, and golf courses.

Due to environmental constraints and other pressures of growth, this type of operation is being phased out and will ultimately disappear.

Other types of privately owned facilities do not supply a domestic service, but are for the sole use of the private owner. Systems of this type are usually for industrial use and include such facilities as those at Stelco in Hamilton and others. In many cases, the water is not treated to a potable level and in other cases the sewage is given only partial treatment before being discharged to a municipal sewer system. Most industries, in fact, have there own sewage treatment plants in some form because municipalities will simply not accept the effluent that comes from the industries in its raw form. In these cases the waste receives pretreatment by the firms before it goes to the local sewage treatment plant.

Crown Corporation. In his 1990 budget statement, the Treasurer of the previous Ontario government announced the creation of a Provincial Crown corporation with the following mandate:

- to build and operate water and sewage facilities in cooperation with municipalities and the private sector;
- to assume responsibility for existing provincial facilities now operated by the Ministry of the Environment; and
- to borrow on its own account, with provincial Government guarantee, to support water and sewage projects.

The purpose of the corporation, ostensibly, is to encourage the completion of more projects, in part through the provision of funds at low interest rates.

However, the recent change in government has made the future of the corporation somewhat uncertain.

Problems of Combined Ownership

Combined ownership structures, of the sort in which different levels of government own different parts of water and sewer systems, can sometimes lead to difficulties.

One problem occurs when the Regional Municipality does not own the distribution system and must wholesale the water to municipalities. In this case, each municipality charges whatever rate it wants for water and sewer services. The problem is one of equity among users in different municipalities within the same region. For example, in the Niagara Region, a homeowner in Grimsby may pay a different rate for water and sewer than a homeowner in Welland, a municipality in the same region. This same situation prevails in Toronto; its six member municipalities have widely-differing rate structures, as will be seen later in our case study of Metro.

In the past, there have been attempts to get municipalities in the same region to charge a uniform rate for water and sewage. However, the costs of providing water and sewage are often different in various locations because plants differ in size, age, efficiency, etc. Also, municipalities may have socio-political reasons for pricing water at a certain rate, irrespective of related costs.

Yet another difficulty arises when both storm and sanitary systems are combined, and one level of government owns the storm sewers (usually the local municipality) while another level of government owns the sewage treatment plant. The problem arises because the rate charged for sewage is usually a function of the total water used by the municipality. For a combined system, the storm water is treated through the sewage treatment plant during periods of heavy rainfall. In such a case, the amount of water processed by the plant, and consequently the cost of treatment is no longer proportional to the chargeable rate.

This section analyzes investment trends in water and sewer infrastructure by municipalities in Ontario over the past decade, and discusses the objectives and criteria that should be considered in the selection of financing and charging options.

There are three main parts of this section. The first part provides a quantitative overview of trends in revenues and expenditures on water and sewage infrastructure. The second part of this section provides a qualitative discussion of the use of alternative revenue sources for water and sewage infrastructure by municipalities in Ontario. The third part discusses the objectives and selection criteria that municipalities must consider in determining the most appropriate financing and charging systems for their circumstances.

Please note that Tables IV-1, IV-2, IV-3 and IV-4 appear within this section. Tables with the single number designations 1-12 appear in Appendix A.

A Quantitative Overview

Expenditures on water and sewer works have been made by all three levels of government in Canada. In the case of the federal government, transfers, and loans have been made to provincial and/or local governments and thus appear as part of the data on municipal expenditures. Provincial expenditures in Ontario have taken the form of direct investment in provincial water and sewer facilities as well as grants and loans to municipal governments. To avoid counting of provincial expenditures twice (that is, once as a provincial expenditure and once as part of municipal expenditures), this section presents information on municipal expenditures on water and sewer (with the understanding that these expenditures include grants from other levels of government) and information on provincial investment in water and sewer systems. A more detailed analysis of grants (federal and provincial) to municipalities for water and sewers is provided in the section entitled "Revenues".

The information and tables presented here are taken from the MARS database for Ontario. The MARS (Municipal Analysis and Retrieval System) database was provided by the Ministry of Municipal Affairs. These data summarize the Financial Information Returns submitted annually to the Ministry by each municipality in Ontario. The data, where available, are for the period 1977 to 1987. The information in the Tables applies only to municipalities where expenditures are made on water and sewers. In other words, all Ontario municipalities are not represented in the database, but rather only those that make expenditures on water and sewers. For the year 1987, for example, 499 of the 839 municipalities in Ontario have recorded water and sewer expenditures.

In all of the Tables, the categories of expenditures are: sanitary sewers, storm sewers and water. These are defined as follows:

- the **sanitary sewer** system includes sanitary sewers (including storm sewers only where there is a combined storm and sanitary sewer system), sewage treatment plants, public washrooms (other than in parks and community centres), service operating agreements with the Ministry of the Environment, other sewer system expenditures and administration;

- the **storm sewer** system includes the storm sewer system where it is separate from the sanitary sewer system and it includes administration; and

- the **waterworks** system includes the waterworks system, debt charges met through taxation, service operating agreements with the Ministry of the Environment and administration.

Expenditures

Here we look at municipal and provincial expenditures on water and sewers. Federal expenditures are included in the section on revenues because they have taken the form of a grant to provinces and municipalities, as noted above.

Municipal Expenditures

This section analyzes capital and operating expenditures on water and sewers by municipalities in Ontario over the period 1977 to 1987. In the case of capital expenditures, it is particularly useful to look at the annual data and not just at the annual average rate of growth over the decade because of the "lumpiness" of capital expenditures. In other words, the construction of a sewage treatment plant in one year will result in a large capital expenditure in that year but not in prior or subsequent years. Annual average growth rates alone will not likely capture this lumpiness.

Capital Expenditures

Tables 1 and 2 provide information on municipal capital expenditures on water and sewers in Ontario in current dollars, constant dollars, current dollars per household and constant dollars per household. For the most recent year, 1987, capital expenditures on sanitary sewers were over $194 million, on storm sewers over $64 million and on water almost $203 million. Although capital expenditures on sewers historically have been larger than on water, the growth over the decade has been larger for water: the growth in capital expenditures on sanitary sewers has been at an annual average rate of 3.7 percent, on storm sewers 4.2 percent, compared to almost 6 percent for water. It appears from Table 1, that the main source of this growth in water expenditures is the increase from 1986 to 1987.

Since growth over the period can reflect, in part, the growth in population, Table 2 looks at municipal capital expenditures per household on water and sewers. Before analyzing these estimates, two points should be noted. First, a household is defined to be a self-contained dwelling unit which has a separate room for preparing meals. This information is provided by the Ministry of Revenue as part of the assessment process. Second, since the expenditures include those made on behalf of industries as well as residences, the expenditures per household are overstated.

Keeping in mind the above caveats, it can be seen from Table 2 that the capital expenditures per household on sanitary sewers in 1987 were $67.26, on storm sewers $22.25 and on water $70.28. Over the decade, the annual average growth in capital expenditures per household for sewers (sanitary and storm) was 1.8 percent and for water over 3.8 percent. Not surprisingly, the growth in per-household expenditures is less than the growth in total expenditures; part of the growth in capital expenditures has resulted from an increase in the number of households.

Another reason for the growth in capital expenditures is inflation. Since local governments have little influence over general price increases in the economy, it is appropriate to deflate local expenditures on water and sewers by a measure of inflation. Table 2 shows capital expenditures in constant 1981 dollars per household for water and sewers where expenditures have been deflated by the implicit price index for government expenditures. Table 2 shows an annual average decline of 4.8 percent in real expenditures per household for sewers over the period 1977 to 1987 and an annual average decline for water of almost 3.0 percent. In other words, in real terms (constant dollars) per household, capital expenditures appear to have fallen quite dramatically over the decade.

There are at least two possible explanations for the decline in real capital expenditures per household. First, the data set begins in 1977 and does not reveal the magnitude of investments prior to that year. One possibility is that, in the 1960s and early 1970s, there were large investments in water and sewage works in response to projections of provincial growth patterns. As a result, the need for additional capital expenditures in the late 1970s and early 1980s in Ontario may have been lessened. The data may be showing a decline in response to overbuilding and do not necessarily reflect insufficient investment in the 1980s.

A second possible explanation is the method of financial reporting. Municipalities are not consistent with respect to the division of expenditures into capital and operating. The consequence for the Tables presented here is that some capital expenditures may appear in the operating budget. A look at the Tables on operating expenditures below suggests that operating expenditures (even in real terms) have increased over the decade for both water and sewers. Some capital components may appear in these estimates, large maintenance expenditures may have postponed the need for new investment.

Table IV-1 on the following page summarizes per household capital expenditures for water and sewer for the year 1986 by different population sizes and types of municipalities. Although no particular pattern emerges from the data, four points can be noted.

First, in the regional municipalities, a greater amount of expenditures appears to have been made at the regional level than at the lower tier level. The regional level of government takes different responsibilities for water and sewers in different regional municipalities. In some cases, it is all regional, in some cases all local and in some cases, the responsibility is shared. Only small capital expenditures were made at the township level but significant expenditures were made by towns with populations of 25,000 or more and by cities of 50,000 to 100,000. This pattern may be explained, in part, by the different role played by the regional government in different municipalities in its jurisdiction, by differing needs in municipalities of different sizes, or by different stages of infrastructure investment in different municipalities.

Second, there are no capital expenditures on the part of the county level of government because water and sewers are not a county function. Within counties, considerable expenditures were made by separated towns, villages of 2,500 people and greater, and by towns.

Third, in terms of districts (these are in Northern Ontario), the largest expenditures have been made by towns, especially those with populations of 5,000 to 10,000.

Fourth, and last, Table 3 shows that investment in water and sewer works in any given year varies considerably across the province. This may result because major investments are made in different years in each municipality. For this reason, Table 4 looks at annual average growth rates over the decade.

Table IV-1: MUNICIPAL CAPITAL EXPENDITURES PER HOUSEHOLD BY POPULATION SIZE, ONTARIO, 1986

Jurisdiction	Population Size (k='000's)	No. of Municipalities	$ per House WATER	$ per House SEWER	$ TOTAL
Metro Toronto					
Upper Tier		1	9.53	25.93	35.46
Cities		5	9.77	30.54	40.31
Borough		1	0.00	79.45	79.46
Regions					
Upper Tiers		12	43.72	52.27	95.99
Cities	100k +	8	4.09	22.06	26.15
	50k - 100k	6	29.18	77.30	106.48
	< 50k	8	5.54	40.01	45.54
Towns	25k +	13	14.88	80.21	95.08
	10k - 25k	19	10.57	23.33	33.90
	5k - 10k	5	0.00	1.90	1.90
	< 5k	1	0.00	0.00	0.00
Villages		1	0.00	0.00	0.00
Townships	10k +	12	5.11	5.60	10.71
	5k - 10k	11	2.94	3.81	6.75
	2.5k - 5k	1	0.00	0.00	0.00
	< 2.5k	2	0.00	0.00	0.00
Counties					
Uppertiers			0.00	0.00	0.00
Cities	100k +	2	21.58	76.27	97.83
	50k - 100k	4	51.10	36.49	87.58
	< 50k	12	58.71	111.97	170.68
Sep Towns		4	445.15	48.91	494.06
Towns	10k +	8	42.59	101.96	144.55
	5k - 10k	20	98.21	127.40	225.61
	2.5k - 5k	27	61.95	81.76	143.71
	< 2.5k	13	32.65	70.65	103.30
Villages	2.5k +	4	132.94	199.41	332.36
	< 2.5k	106	72.55	68.72	141.27
Townships	10k +	8	12.49	252.05	264.54
	5k - 10k	35	31.95	7.09	39.05
	2.5k - 5k	98	29.71	9.09	38.80
	< 2.5k	186	0.38	1.22	1.60
Districts					
Cities	100k +	1	10.39	27.38	37.77
	50k - 100k	2	53.26	106.52	159.79
	< 50k	1	25.09	64.51	89.60
Towns	10k +	3	38.35	120.23	158.58
	5k - 10k	9	250.94	166.89	417.83
	2.5k - 5k	6	35.98	142.83	178.81
	< 2.5k	18	53.60	79.25	132.85
Villages		8	54.96	0.00	54.96
Townships	2.5k +	11	34.53	346.55	381.09
	< 2.5k	113	42.52	42.79	85.31
Dev. Area Boards		1	0.00	0.00	0.00
Imp. Districts		7	96.29	568.06	664.35

The annual average rates of growth in real capital expenditures per household on water and sewers in Table IV-2, on the following page, suggests that there has been a decline for many categories of municipality and small positive growth for others. The growth appears to have occurred mainly in the small municipalities, especially in northern Ontario districts. In other parts of the province, growth has been in municipalities with populations of less than 10,000, and in many cases, less than 5,000.

Operating Expenditures

Tables 3 and 4 summarize information on municipal operating expenditures for sewers and water in Ontario over the period 1977 to 1987. Table 3 shows that operating expenditures for sanitary sewers in 1987 were over $504 million, for storm sewers over $60 million and for water almost $546 million. With the exception of storm sewers, these expenditures are considerably larger than the capital expenditures on these functions. Over the decade, sewer (sanitary and storm) and water operating expenditures each grew at an annual average rate of almost 10 percent. In real terms (constant 1981 dollars), water expenditures showed an annual average increase of 2.5 percent; sewers showed an annual average increase of 2.4 percent. The increase for sewers actually reflects a slight decline in real terms for storm sewers and an increase for sanitary sewers.

Table 4 presents operating expenditures per household, which amounted to $174.82 for sanitary sewers, $20.89 for storm sewers and $189.18 for water in 1987. The growth per household over the decade was at an annual average rate of 7.5 percent for total sewers and 7.6 percent for water. In real terms (constant 1981 dollars) per household, Table 4 shows that the annual average growth rate was less than 1 percent for both sewers and for water. The increase for sewers is comprised of a decline for storm sewers and an increase for sanitary sewers. Over the period 1977 to 1987, operating expenditures (measured in actual dollars, per household and in real terms per household) grew at a similar rate for water and sewers. Capital expenditures, as noted above, grew at a faster rate for water.

Tables 5 and 6 break down operating expenditures by object of expenditure: salaries, wages and benefits; net long term debt charges (charges on net long term liabilities -- principal repayments, sinking fund contributions, interest on long term debt); materials, services and rents; transfers to own funds (capital fund, reserves and reserve funds); other transfers (for example, to individuals or organizations); and inter-functional transfers (for example, where fire hydrant service is being provided by the waterworks department for fire protection).

The most interesting point to note from these Tables is the reduction in the percentage of total operating expenditures accounted for by net long term debt charges and the increase in the percentage of expenditures accounted for by transfers to own funds. The change in emphasis over the decade is particularly striking for sanitary sewers and water and less so for storm sewers. It appears from Table 6, that municipalities are relying much less on borrowing than in the past and much more on transferring revenues to their own funds to use for expenditures (capital and operating) in the future. This point is discussed further below under the analysis of revenues.

Table 6 also shows that, for sanitary sewers, the largest component of expenditures in 1987 was materials, services and rents, followed by net long term debt charges. For storm sewers, the largest component of expenditures was net long term debt charges. For water, the distribution shows that materials, services and rents is the major component, followed by salaries and wages and then by transfers to own funds. Net long term debt charges account for a particularly small portion of operating expenditures for water.

Table IV-2: AVERAGE ANNUAL GROWTH IN REAL EXPENDITURES PER HOUSEHOLD BY POPULATION SIZE, ONTARIO 1977-86 (PERCENT)

Jurisdiction	Population Size (k='000's)	% Growth Sewers	% Growth Water
Regions			
Cities	100k +	-0.11	-0.04
	50k - 100k	-0.04	0.11
	< 50k	-0.10	-0.17
Towns	25k +	-0.06	-0.0012
	10k - 25k	-0.09	-0.08
	5k - 10k	-0.29	-1.00
	< 5k	-1.00	NA
Townships	10k +	-0.25	0.00
	5k - 10k	0.27	0.46
	2.5k - 5k	NA	-1.00
	< 2.5k	NA	NA
Counties			
Cities	100k +	-0.02	-0.07
	50k - 100k	-0.13	0.04
	< 50k	-0.02	-0.02
Towns	10k +	-0.01	-0.02
	5k - 10k	0.05	0.08
	2.5k - 5k	-0.07	-0.03
	< 2.5k	0.05	-0.08
Villages	2.5k +	0.73	0.08
	< 2.5k	0.11	0.03
Townships	10k +	0.02	-0.15
	5k - 10k	-0.07	0.21
	2.5k - 5k	0.11	0.15
	< 2.5k	-0.10	-0.25
Districts			
Cities	100k +	-0.27	-0.29
	50k - 100k	-0.01	0.01
	< 50k	-0.21	-0.16
Towns	10k +	0.06	0.05
	5k - 10k	0.10	0.09
	2.5k - 5k	0.09	-0.10
	< 2.5k	0.45	0.01
Townships	2.5k +	0.88	0.15
	< 2.5k	0.00	0.19

Provincial Expenditures

Here we look at direct provincial expenditures by the Ontario Ministry of the Environment in its own water and sewer systems over the period 1976/77 to 1988/89. These data are not available in the MARS database because they are expenditures made by the provincial government and are not accounted for in municipal financial returns. The data in Table IV-3 are not strictly comparable with the other Tables in this section because they are from a different source and because they are based on the provincial fiscal year ending March 31; municipal data are based on the calendar year. Thus, it is not possible to add provincial and municipal expenditures to determine total expenditures on water and sewers. As noted earlier, the estimates in Table 7 do not include provincial grants to municipalities for water and sewer; the grants estimates appear in the revenue section of this study.

Table IV-3 summarizes provincial investment in water and sewer systems. Large investments in the early part of the period (roughly from 1976/77 to 1980/81) suggest major investment in both water and sewers in the late 70's. There was a steady decline in provincial investment in sewers from 1981/82 through to 1987/88 and a slight increase in 1988/89. In the case of water, the decline continued from 1979/80 to 1984/85. By 1985/86 provincial investment in water began to increase again. Some municipal finance experts suggest that the decline in provincial investment (as with municipal expenditures above) could reflect, at least in part, overbuilding in the 70's and thus less need for investment in the 80's. The decline of provincial capital investment in its own facilities could also reflect the transfer of some of its facilities to municipalities over this period.

Table IV-3: Provincial Investment in Water and Sewer Systems
Ontario, 1976/77 to 1988/89
(Current Year $,000)

Year	Sewer	Water
1976/77	114,800	31,176
1977/78	100,900	34,172
1978/79	96,569	50,667
1979/80	110,574	28,907
1980/81	101,910	21,736
1981/82	32,943	16,558
1982/83	58,863	13,369
1983/84	59,529	8,612
1984/85	49,128	6,452
1985/86	20,001	13,869
1986/87	11,789	12,653
1987/88	9,095	22,776
1988/89	17,633	27,570

Note: These estimates are based on fiscal years ending March 31.
Source: Ontario Ministry of the Environment

Revenues

Here we look at sources of revenue used by municipalities for operating and capital expenditures.

Municipal Capital Revenues

Tables 7 and 8 summarize the sources of capital financing for water and sewers for municipalities in Ontario over the period 1977 to 1987 in constant 1981 dollars, and by percent respectively. In 1987, total capital revenues were over $194 million for sanitary sewers, over $64 million for storm sewers and almost $203 million for water. These numbers correspond to the capital expenditures in Table 1 above. The sources of revenue for capital financing include: Ontario grants, federal grants, grants from other municipalities and money from own sources (where own sources would include property taxes, direct billings, user fees, and development charges, often refered to as lot levies).

As shown in Table 8, the largest source of capital financing for water and sewers is own sources followed by provincial grants. Own sources accounted for almost 76 percent of total capital revenues in 1987 for sanitary sewers, 71 percent for storm sewers, and almost 80 percent for water. For all three services, provincial grants as a percentage of total capital revenues have increased over the decade, especially for sanitary sewers and water. In 1987, provincial grants accounted for 24 percent of total capital revenues for storm sewers and almost 19 percent for water. Revenues from own sources have increased as a proportion of the total for sanitary sewers but fallen for storm sewers and water. Grants from the federal government have declined noticeably over the period as a source of capital financing for municipal water and sewers. In 1987, they were zero for storm sewers and very small for sanitary sewers and water.

Municipal Operating Revenues

Table 11 summarizes the sources of operating revenues for municipalities in Ontario for water and sewers over the period 1977 to 1987. The sources are: direct water and sewer billings, taxation (including special assessments and other charges on tax bills), Ontario grants, Canada grants, fees and charges paid by other municipalities and fees and charges within the municipality and other revenues (an estimate of property taxes and unconditional grants). Fees and charges include water and sewer connection charges excluding those collected on the tax bills and those collected on direct water and sewer billings.

Unfortunately, the MARS database does not summarize total operating revenues for water and sewers in one Table. Where water and sewers are financed in part by general property tax revenues, this information is not available. The only way of determining the use of property taxes for water and sewer is to subtract other identified sources from total revenues. In terms of water and sewer billings, as will be noted below, some of these revenues are used for operating purposes and some are used for capital purposes.

Table 11 shows that the largest source of operating revenues in 1987 (and historically) is direct water billings on ratepayers at over $355 million. The second largest source was special area rates at almost $297 million - these are taxes levied by mill rate for specific purposes (water and sewer) in specific locations within a municipality. Sewer surcharges (on water billings) were almost $189 million in 1987. The remaining revenue sources were less significant in terms of magnitude: other charges on the tax bill (charge not levied by mill rate but rather lump sum) amounted to almost $12 million, provincial and federal grants for almost $7 million and fees and charges for $65 million. "Other" revenues provide an

estimate of general property taxes and unconditional grants that have been applied to sewers and water. Historically, the general revenue sources have been used for water and sewers.

Table 12 also shows the use of these different sources of revenue on the tax bill by the number of municipalities. In 1987, 187 municipalities (out of 495 municipalities which recorded sewer and water expenditures in that year) charged direct billings only. One hundred and fifty-six municipalities charged direct billings in combination with other charges on the tax bills and only 28 made use of direct billings and special area rates. In total, this means that 371 municipalities (or a vast majority of the 495 municipalities) made use of direct billings either on their own or in conjunction with some other method of charging. Very few (only 3) municipalities used only special area rates and only 51 used only other charges on the tax bill.

An Analysis of Alternative Revenue Sources

Municipalities in Ontario rely on five basic revenue sources for financing capital expenditures on water and sewer works: water and sewer rates, property taxes, grants from other levels of government, development charges, and long-term borrowing. Each of these is discussed in turn, followed by a summary and conclusion.

1. Water and Sewer Rates

Water rates are charged to customers for the operation, repair, maintenance and capital costs of the water system. Sewer charges are frequently calculated as a percentage of water rates.

Charges for Water Service

Water rates in Ontario are not regulated by government, nor are there at present any generally adopted procedures for their development. The establishment of water rates is a local responsibility and the absence of standard procedures has resulted in the evolution of a great variety of rate structure formats.[3]

There are two principle types of water rates applied in Ontario: volume-based rates and flat rates.

Volume Based Rates

Volume based rates relate the amount paid for water servicing to the amount of water supplied. Several different methods can be used for establishing this linkage, the simplest being a constant unit rate per unit of water used. Often however, volume charges vary with the level of water used or according to user groups and are combined with certain fixed charges. These are commonly referred to as block rate schedules.

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[3] Ontario Municipal Water Association, and Ontario Section of the American Waterworks Association. Water Rates in Ontario: Principles and Practices. (1979).

A difficulty in applying volume rates is that the method of measuring customer usage - the water meter - only measures total quantity, while the cost of providing water may vary according to factors other than volume. For instance, supplying water during peak demand periods contributes significantly to water system costs. There are also other fixed costs which do not relate to volume of usage.

A metered rate schedule can contain a metered rate (consumption charge) and may contain other, different components such as a service charge, an unmetered fire line charge, and a minimum bill. Nonetheless, the fundamental component of all metered rate structures is the consumption charge or metered rate. This rate is used to calculate the consumption charge according to meter readings.

Some municipalities use only a consumption charge to raise all their revenues. Others also use a service charge, usually related to meter size, which is added to the consumption charges. The service charge may cover the cost of providing reserve water capacity or certain customer related costs such as: meter repairs, meter reading, service connection repairs, billing and data processing, and providing extra capacity for lawn watering and fire protection.

Frequently, municipalities will bill a minimum charge to ensure that enough customer revenue is generated to cover certain fixed system expenditures. In addition, some municipalities have a separate unmetered fire line rate. This rate charges customers for non-metered services used solely for fire protection, such as sprinklers and private fire hydrants.

Flat Rates

One of the simplest rates to administer is the flat rate, which involves only a fixed levy imposed in each billing period. In return for this levy, the customer is given unlimited access to water supply and sewage services. Municipalities determine flat rate charges in a variety of ways, taking into account the cost of providing service and in some cases expected consumption. Charges may vary among users within the same municipality. The principal disadvantage of flat rate pricing is that it results in higher water use than volume-based pricing.[4]

Charges for Sewer Services

There are three different forms a charge for sewage treatment can take, as described below.

A charge based on the consumer's mill rate added on to property and business taxes.

The potential advantages of this system are threefold:

- billing for the service is simple;
- undeveloped property can be assessed for the benefit received from having a wastewater system available to the property, provided some basis is found for measuring this benefit, and;
- all property can be assessed for the general benefit to a municipality of a water pollution control system (increases in assessments, health benefits, etc.).

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[4] D.M. Tate, Municipal Water Rates in Canada, 1986 - Current Practices and Prices, Social Science Series No. 21, (Inland Waters Directorate, 1989).

The disadvantage of a mill rate charge is that users do not necessarily pay in proportion to their use or the benefit they receive.

A surcharge added onto the water bill of the consumer.

This charge is usually calculated as a fixed percentage of the total charge for water use. The advantages of a sewer surcharge are:

- it assesses users in proportion to their use of the service;
- it offers a method of raising revenue other than by property or business taxes; and,
- it assesses tax-exempt properties such as churches, schools, government properties, and hospitals.

The disadvantage of this method of charging is that the water-sewer system is not compensated for the benefits that accrue to undeveloped properties with access to the system.

Extra-strength sewer surcharges.

In cases where customers discharge highly polluted effluents into the sewer system, a surcharge is applied sometimes to cover the added costs of treating this waste.

Generally, the extra strength sewer surcharge (ESSS) is a charge paid by industrial users of sanitary sewers that increases as the concentration of targeted contaminants in their wastewater increases beyond a designated level.[5]

The surcharge ensures that beneficiaries of sewer systems pay according to their contribution to the cost of operating the system, and provides an economic incentive to reduce wastewater strength.

Current Practices in Ontario

It is common in Ontario for municipalities to employ multiple rate schedules, consisting of a volume rate for metered customers and a flat rate for unmetered customers. This normally applies for both water and sewer charges, because of the usual linkage between them. Below are survey data (from Tate, p. 4) of rate schedules used by Ontario municipalities. Note that the total number of schedules is greater than the number of municipalities surveyed due to multiple rate schedules).

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5 Ecologistics. The Extra-Strength Sewer Surcharge to Regulate Industrial Sanitary Sewer Surcharge to Regulate Industrial Sanitary Sewer Users. (Ministry of the Environment, 1980).

Table IV-4: Frequency Distribution of Water and Sewage Rate Schedules Used by Ontario Municipalities

User Group	Flat rate	Volume-based rates: Constant unit rate	Volume-based rates: Declining block rate	Volume-based rates: Increasing block rate	Total number of municipalities
(a) Residential	99	62	70	2	233
(b) Commercial	60	65	96	2	223

Though volume-based rates accounted for more than half (58%) of the residential rate schedules, analysis showed that the first block of block rate schedules (i.e. the range of water volumes to which the minimum charge applies) is often quite large. In other words, customers in communities with this sort of schedule effectively face a flat rate in the range of normal water usage. (Tate, 1980, p.4).

Flat rates imply that the marginal cost of water is zero, which is clearly not the case. Users are not charged more for greater volumes of water used, and so are not encouraged to use water efficiently. Even in cases which appear equitable at first glance, water charges may, in fact, be inequitable. For instance, declining block rates are not necessarily fair, as pointed out in D.M. Tate's study:

> Under these types of rate schedule, the greater the volume of water used, the less paid per unit of use. For municipal water systems, large users generally dictate the system design capacity, one of the most important (and costly) design parameters for water systems. Large users may have high usage rates or high peaking requirements, or both. Thus, in many cases, a municipality may be forced to have systems larger than required to meet the needs of most users in order to cater to the needs of a few large users. In these cases, the majority (small users) are actually subsidizing the needs of a few (large users), and an apparent equitable charging system is actually inequitable. The same criticism is even more serious in instances of flat rate charging systems. (Tate, 1980, p.p. 8-9).

The above table (IV-4) shows that 30-40% of Ontario Municipalities use flat rates. These municipalities do not have rates that are efficient, in terms of reflecting the cost of the marginal unit of usage, and in many cases are inequitable.

Billing

As a general rule, whoever owns the distribution and collection system for water and sewage, bills the customers. For example, in cases where the Regional Municipality owns the system, users get a water and sewage bill directly from the Regional Municipality. In cases where the PUC owns the facilities, users get a bill directly from the PUC.

Capital Financing

The extent to which water rates can be used to finance capital costs is governed by three provincial statutes (see Ontario Muncipal Water Asociation, and Ontario Sectionof the American Waterworks Association. Water Rates in Ontario: Principles and Practices. (1979)): the Local Improvement Act, the Municipal Act and the Public Utilities Act. The application of each Act depends on the distribution of the benefits. Under the Local Improvement Act, the rates set for capital projects must apply specifically to the lots benefitting from the investment. Under the Municipal Act, municipalities can impose rates to cover capital costs on owners or occupants of land who derive or will derive or may derive benefits from the capital works. Finally, under the Public Utilities Act, municipalities can impose rates to cover capital construction costs even though owners or occupants of the property are not connected to the service.

Thus, water (and sewer) rates are established on the basis of both operating costs and capital costs financed out of operating revenues. In calculating the rates, municipalities take account of other revenue sources available (such as federal or provincial grants and lot levies). Pricing decisions tend to be based on two principles[6]: the first is that revenues should be sufficient to cover costs and second, that equity be maintained among customers. This has generally been interpreted as average cost pricing. In terms of efficiency considerations, it would seem more appropriate to use some form of marginal cost pricing which reflects the additional costs incurred in servicing different properties. Marginal cost pricing would lead to a more efficient allocation of resources for water and sewers and more efficient use of these services. Tate (1989) asserts that acceptability to ratepayers is the overriding principle used in rate setting and not cost recovery, equity or efficiency. This assertion has not been tested.

Measurement Problems

There are 5 principle difficulties in the measurement of water and sewer use:

- lack of metering of customer water use;
- imprecise measuring techniques for estimating water flow;
- infiltration into the sewage system;
- unaccounted-for water as a result of leakage; and
- unaccounted-for water as a result of non-metered use.

In Ontario, there are many municipalities that meter only a portion of their water users, and there are some that do not meter users at all. As a result, many customers are not billed in direct proportion to their use of water, and it is difficult to identify all users.

Imprecise flow measuring techniques also pose a problem. The old system of floats and weirs was inaccurate for measuring sewer flows, and other antique methods and equipment for measuring high volume water flows gave poor results as well. However, by using ultrasonic measurement devices for flows and checking weirs for cleanliness and for capacity by "draw/fill" checks, the degree of accuracy can be improved.

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[6] See Harry Kitchen. A Statistical Estimation of a Demand Function for Residential Water, Social Science Series No. 11. (Ottawa: Environment Canada, 1975), p.1.

Of course, accurate flow measurement may not accurately reflect use, because of the problems of leakage and infiltration. Water leaking into sewer pipes and out of water mains can have a great effect on measurements and hence on efforts to bill accurately according to usage.

Another difficulty lies in the fact that even in municipalities where the metering of individual customers is extensive, there is still significant unmetered water use. Examples of water which is used, but often not metered, include water used for water main and sewer flushing, fire fighting, and street flushing.

Exhibit IV-1, illustrates some of the flow measurement problems.[7] Between the water supply plant and the sewage treatment plant, a number of factors may affect flow measurement. Water leaking out of water mains under pressure is very difficult to account for, particularly if there is unmetered water use. Distinguishing between the costs of unmetered water use and leakage is important, if an economically efficient, and fair, system is to be maintained. On the sewage end, seepage of water into sewers complicates the measurement of discharges. Even a calculation based on metered water use is potentially inaccurate, if there is significant non-sanitary use, such as the watering of lawns. Such use is further complicated by the fact that this water may itself seep into the sanitary sewer system or drain into the storm sewer system or both, or neither.

2. Property Taxes

If a municipality chooses not to levy separate water and sewer rates, then it is required to cover its costs by applying a mill rate to the assessment base of the municipality. Unfortunately, property tax revenues are used for many different municipal services, and thus, there is no breakdown of the magnitude of property tax revenues that are used for capital purposes for sewers and water. Although property taxes are not common for water and sewer, there is one notable exception. Many municipalities apply a mill rate for fire protection revenue on the grounds that the requirement for fire protection is related to property values (Kitchen, 1986, p. 36).

The disadvantage of using municipal-wide property tax revenues, even to the extent that they are now used for water and sewers, is that the amount levied is not related to the use of the service unless one believes that property values are a good measure of water and sewer use. Where urban service areas are defined, in other words, where the property tax is only levied on those areas of a municipality where the service is being used, then there is a closer relationship between use and payment. Only those ratepayers getting the service are paying for it.

3. Grants from Other Levels of Government

Historically, both the federal and provincial governments have been involved in water and sewer grants. Grants by each level of government are summarized below.

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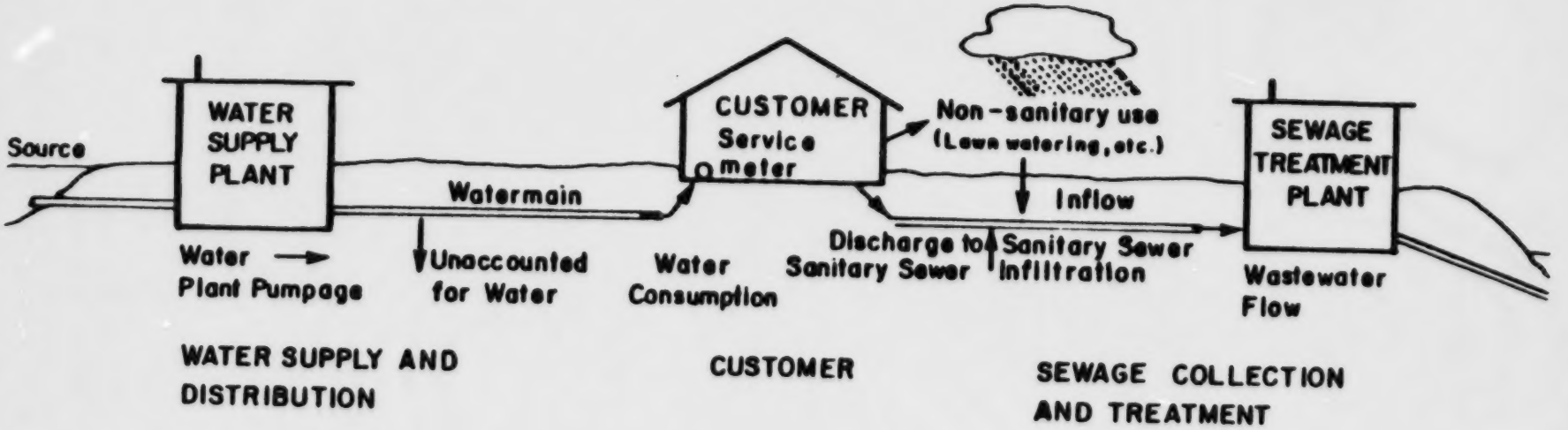
[7] This exhibit is from, Ontario Municipal Water Association and Ontario Section, American Water Works Association. Water Rates in Ontario, Principles and Practices. (London, Ontario, 1979).

EXHIBIT IV-1



FROM WATER SUPPLY TO SEWAGE TREATMENT
LOSSES, USE AND ADDITIONS

From: Water Rates in Ontario, Principles and Practices

Federal Transfers for Water and Sewers

Although the federal government virtually ceased to provide grants for infrastructure in Canadian municipalities in the mid-1980s, federal transfers to municipalities began in 1938 and extended in various forms throughout the period until 1984. Federal programs included: Municipal Improvements Assistance (1938 to 1940), the Municipal Development and Loan Program (1963 to 1966), the Sewage Treatment Program (1961 to 1974), the Neighbourhood Improvement Program (1974 to 1977), the Municipal Infrastructure Program (1975 to 1978), and the Community Services Contribution Program (1979 to 1980). More recently, there were two programs: the Special Recovery Capital Projects Program and assistance for Great Lakes Water Quality. All of these federal programs are discussed below (for a more detailed discussion of federal transfers, see Amborski and Slack, 1987).

The earliest federal assistance (from 1938 to 1940) was under the Municipal Improvements Assistance Act. Under this program, loans were provided for water and sewage improvement projects. A similar program under the Municipal Development and Loan Act also provided assistance for sewage as well as transportation systems over the period 1963 to 1966. Both of these programs were designed mainly to create jobs through investment in capital works. However, the extent to which investment in infrastructure affects economic growth is uncertain. Sonnen (1987) notes that infrastructure spending increases national income and employment especially when debt (as opposed to user fees and taxes) is used to finance the expenditure.[8] The expenditure creates jobs and increases income in the economy. However, it is expected that other types of public (and private) investment will also have an impact on the economy so it is unclear whether infrastructure spending stimulate the economy more than other types of expenditures.

Under the auspices of CMHC, the Sewage Treatment Program operated from 1961 to 1974. Under this program, loans were provided (some portion of which was forgivable) for the construction of sewage treatment and collection systems. A second program administered by CMHC was the Municipal Infrastructure Program which was basically an extension of the Sewage Treatment Program. The Municipal Infrastructure Program under the National Housing Act was in existence from 1975 to 1978 and provided a range of grants.

The Neighbourhood Improvement Program (NIP) was initiated in 1973. This program provided funding on a cost-shared basis (50/25/25 federal, provincial, municipal) for improvements to local infrastructure in selected low-income residential neighbourhoods. Sewer and water expenditures as well as parks and recreational facilities were eligible for assistance under this program.

The Community Services Contribution Program (CSCP) which was in existence from 1979 to 1980 was enacted under the National Housing Act. It replaced both the Municipal Infrastructure Program and the Neighbourhood Improvement Program. Funding was expanded to include other services besides sewer and water such as social services. The funding was in the form of block grants allocated to the provinces on the basis of population and income. In the case of Ontario municipalities, the provinces transferred $31 million in 1980/81 and almost $52 million in 1981/82 to municipalities under this program (data in this paragraph and the next wee provided by the Budget Control Section, Project Engineering Branch, MOE.)

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8 See C. Sonnen "Infrastructure Investment and Economic Growth", in Federation of Canadian Municipalities, Proceedings of the Canadian Conference on Urban Infrastructure. (Edmonton: Sodanell Canada, Inc., 1987).

Under the federal government Special Recovery Capital Projects Program to stimulate local employment, the Province transferred federal funds to Ontario municipalities over the period 1983/84 to 1985/86: $1.7 million in 1983/84, $6.5 million in 1984/85 and $1.3 million in 1985/86 respectively. Finally, transfers of federal government grant assistance to Ontario municipalities for sewage works construction affecting Greater Lakes Water Quality have amounted to over $63 million in the period 1982/83 to 1987/88, with the largest grants in the first three years (information provided by the Ministry of the Environment).

Provincial Grants for Water and Sewers

In addition to its own expenditures on water and sewage facilities, the Ministry of the Environment provides some assistance to municipalities. The following discussion summarizes the role of the provincial government historically in water and sewer infrastructure and summarizes the main grant programs for the year 1988. Grants by ministries other than Environment are summarized briefly and some important issues relating to provincial assistance are outlined.

Historical Role of the Ontario Government

The following historial summary was developed for several sources including Ministry background documents. In 1957, the newly established Ontario Water Resources Commission (OWRC) provided assistance to municipalities to clean up pollution and provide water and sewer servicing for new growth. The assistance took the form of financing (30-year loans at preferred interest rates), supervision of design and construction and operation of OWRC-Municipal Joint Programs (see Ministry of the Environment, Capital Construction Assistance Program, 1957 - 1980). Ownership was retained by the provincial government with the intention that there would be a transfer to the municipality when the debt was retired.

In 1965, Provincial Programs were introduced to provide water and sewage services to municipalities from provincially-owned facilities. Fees for service were set at a rate to retire the debt over 40 years as well as to cover the operating costs. In 1969, a subsidy was introduced for small municipalities who could not afford the service charge plus a subsidy to municipal projects which serviced areas covering two or more municipalities. The idea behind these subsidies was to encourage economies of scale.

In 1972, the OWRC was integrated into the newly established Ministry of the Environment. In 1973, subsidies to small municipalities to assist in the high service fees were increased. These subsidies, in conjunction with federal transfers (outlined above), brought a large expansion of the capital construction program (see MOE, Capital Construction Assistance Program, 1957 - 1980).

In 1974, after a review of the capital construction program of the Ministry, restructured municipalities became eligible to receive a capital grant for major works projects. These represented the first grants to non-Ministry projects. From 1978 onward, there was a new thrust in provincial involvement in water and sewer infrastructure. In particular, more emphasis was placed on greater local responsibility for capital financing (see MOE, Capital Construction Assistance Program, 1957 - 1980). Current grants are described below.

Current Grant Programs

Environment Ontario provides grants: to assist in the construction of new communal water and sewage works systems; to upgrade or repair private water supply or sewage disposal facilities; to assist rural

municipalities in the construction of water pipelines; to assist the rehabilitation of water distribution or sewage collection systems; and to assist in the cost of completing pollution control planning studies.[9]

- Communal Water and Sewage Works

  The provincial government provides direct grants to municipalities for new water supply and waste water treatment works. These works may include: water intakes, treatment or storage facilities, and trunk watermains along with sewage treatment facilities, outfall sewers, trunk sanitary sewers, and associated pumping stations. For municipalities with populations of greater than 7,500, the grant assistance is 15 percent of eligible expenditures. For projects to resolve health or environmental problems, the grant is up to 33 percent of the approved costs of meeting current requirements and 15 percent of the project cost which relates to the servicing of new urban development.

  Municipalities with populations less than 7,500 are eligible for additional grant assistance for local water distribution and sewage collection works. Grants are estimated according to a formula which is based on population and range from 33 to 85 percent of eligible costs.

- Upgrading or Repair of Private Facilities

  Grant assistance of up to 85 percent is available for upgrading or repair of private water supply or sewage disposal facilities. The formula applied is based on population and the servicing of seasonal residences is not eligible for assistance.

- Rural Water Pipelines

  The construction of water pipelines in rural areas outside of urban boundaries is eligible for assistance at the rate of 33 percent.

- Rehabilitation of Water Distribution and Sewage Collection Systems

  A grant based on population (with a minimum grant of 50 percent) is available to undertake a "needs study". To carry out physical rehabilitation, as recommended in the "needs study," a 33 percent grant is available.

- Pollution Control Planning Studies

  Grant assistance of between 50 and 85 percent (based on population) is available for the development of a water pollution control plan for a defined urban or rural area.

- Other Provincial Grants

  In addition to grants for water and sewer provided by the Ministry of the Environment, other provincial ministries have provided funds. In the 1970s, for example, the Ministry of Housing, under OHAP (Ontario Home Ownership Assistance), provided loans for water and sewers. Currently, the Ministry of Northern Development and Mines provides grants to municipalities

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9 See Ministry of Municipal Affairs. Provincial Financial Assistance to Municipalities, Boards and Commissions. (1988), p.p. 28-30.

in Northern Ontario for water and sewer construction. Finally, some portion of the unconditional grants received by the municipality are allocated to water and sewers.

Issues Concerning Federal and Provincial Grants

There are two important issues concerning federal and provincial grants to municipalities for water and sewers. The first issue is the appropriate role for each level of government in water and sewer infrastructure. Simply stated, what percentage of the costs should be funded by each level of government? A literature exists which suggests that there is a role for each level of government based on the extent to which the benefits derived from water and sewer systems go beyond municipal boundaries.[10] Economic theory suggests that, in the presence of external benefits, municipalities will undersupply the service because it does not take into account the benefits beyond its boundaries. One way to encourage municipalities to supply the socially optimal level of services is through the use of federal or provincial grants. Provincial grants are justified where the benefits go beyond municipal boundaries; federal grants are justified where the benefits go beyond provincial boundaries.

The theory suggests that where the grant is designed to alleviate externalities, the rate of grant should reflect the magnitude of the externality -- if 33 percent of the benefits of the expenditure spill over into other jurisdictions, then the matching rate of grant should be 33 percent: the provincial government would pay for 33 percent of the expenditures, the local government would pay for 67 percent. These results have implications for the design of provincial (and federal) water and sewer grants).

The second issue concerns the impact of various types of grants on municipal spending on water and sewers. The literature suggests that matching grants (where, for example, the province funds a percentage of the cost) stimulate local spending to a greater degree than block (or lump sum) grants.[11] The reason is that a matching transfer has a price effect as well as an income effect. In other words, it not only provides the municipality with more money to spend (the income effect) but it also lowers the price of the particular service it is financing.

4. Development Charges

Development charges (or lot levies) can be levied by municipalities in Ontario to finance the growth-related costs of new development. These charges have been applied in Ontario since the 1950s under the authority of the Planning Act. In November, 1989, the Development Charges Act was passed.

Current Legislation

The Development Charges Act permits the levying of development charges by municipalities and school boards, if a residential or commercial development would increase the need for municipal services or

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10 See D. Amborski and E. Slack. "Federal, Provincial, Municipal Cooperation: Past, Present and Future," in Federation of Canadian Municipalities, Proceedings of the First Canadian Conference on Urban Infrastructure. (Edmonton, Sodanell Canada, Inc., 1975).

11 See, for example, Enid Slack. "Local Fiscal Response to Intergovernmental Transfers," Review of Economic and Statistics, Volume 64, p.p. 364-370.

would increase education capital costs. Both regional municipalities and local municipalities can levy charges as well as public and separate boards of education.

Development charges can be levied for the capital costs of hard services (such as sewers, water and roads) and soft services (such as recreational facilities, libraries, and day care centres). Capital costs are defined to mean costs,[12]

(a) to acquire land or interest in land;

(b) to improve land;

(c) to acquire, construct or improve building and structures;

(d) to acquire, construct or improve facilities including,
  (i) rolling stock, furniture and equipment, and,
  (ii) materials acquired for circulation, reference or information purposes by a library board as defined in the Public Libraries Act, 1984; and

(e) to undertake studies in connection with any of the matters in clauses (a) to (d) required for the provision of services designated in a development charge bylaw within or outside the municipality, including interest on borrowing for those expenditures under clauses (a), (b), (c) and (d) that are growth-related.

The growth-related net capital cost is the portion of the net capital costs (net of grants and subsidies) that is "reasonably attributable to the need for such net capital cost that results or will result from development in all or a defined part of the municipality." (Section 1)

In terms of the calculation of the charge, bylaws passed under The Development Charges Act (Section 3(3)) have to do the following:

(a) designate those uses of land, buildings or structures upon which a development charge shall be imposed;

(b) designate the areas within which a development charge shall be imposed;

(c) establish the development charge, or the schedule of development charges, to be imposed in respect of the designated uses of land, buildings or structures; and

(d) designate services for which a development charge may be imposed.

Under these provisions, a municipality can levy on residential, commercial and industrial property. It can exempt some uses and some parts of the municipality from the charge.

The definition of growth-related capital costs is confused in terms of the need to relate the development charge to a development in all or part of the jurisdiction. On the one hand, the legislation appears to recognize that the charge will not be related to a particular development but rather will be an average

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[12] Government of Ontario, Development Charges Act, 1989 (Ministry of the Attorney General, 1989), Section 1.

of costs resulting from development generally. On the other hand, the definition of growth-related capital costs implies a causal connection between the need to incur these costs and development in the jurisdiction. Thus, levies can be uniform across the municipality based on average costs or they can be site-specific.

Under the Regulations, it is stipulated that the calculation of the charge be based on standards for services that are no higher than current standards or standards over the preceding ten years in the municipality or the designated part of the municipality. Development charges may be indexed for inflation in accordance with the Regulations.

With respect to the timing of the payment, the development charge is payable on the date the building permit is issued. However, for some services such as water supply, sanitary sewers, storm drainage and transportation, the development charge may be payable immediately upon entering a subdivision agreement or the municipality may make an agreement with the developer to pay the charge on other dates or to have the developer provide services in lieu of payment.

Current Use of Development Charges in Ontario

Current use of development charges does not reflect the current legislation, since it was only recently passed. The use of development charges by Ontario municipalities varies considerably, but there are some similarities. Development charges have tended to be uniform across municipalities. Few municipalities in Ontario levy on commercial and industrial developments. Charges do tend to vary by the characteristics of dwelling units (for example, single family, semi-detached, townhouses and so forth). Generally the charges are applied for sewers, water and roads but they have also been applied for recreation, administration and other purposes. Development charges are generally based on a 10 to 20-year forecast of capital costs. Funds are put into reserve until needed.

In terms of the calculation of the charge, the total estimate of growth- related costs of all development (by housing type) in the municipality is divided by the number of lots to determine the magnitude of levy per lot. The levy thus calculated does not reflect the costs of any individual development but rather it represents an average of the costs for all new developments in the municipality. This method does not reflect the marginal cost of providing services and, for this reason, reduces the potential efficiency advantages of development charges (see below). The new legislation, as noted above, does permit differential levies for different developments.

Development charges are an important source of revenue to municipal governments in growth areas but not large relative to other sources of capital financing. In 1987, municipalities in Ontario raised $397 million from lot levies of which 73.8 percent were levied in the Greater Toronto Area (municipalities in Halton, Peel York, Durham and Metropolitan Toronto). Over the period 1982 to 1987, lot levies increased five-fold (Ontario Budget, 1989, p. 94). Lot levies tend to be greatest in rapidly growing parts of the province,[13] especially in the Greater Toronto Area and the Region of Ottawa-Carleton. Combined regional and local levies in 1989 were as high as $13,000 in municipalities in the Region of Peel and in parts of Ottawa-Carleton.

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[13] Enid Slack. An Economic Analysis of Development Charges in British Columbia and Ontario. (Vancouver: The Laurier Institute, 1990).

An Analysis of Development Charges

We present here an introductory discussion of development charges. These will be discussed further, in detail, in section 5.0. In terms of the significance of development charges in placing the burden of growth on new development as opposed to existing taxpayers, three points should be emphasized.

- First, it is likely that the new homebuyer will share the burden of the development charge with the developer by ratios that will vary with circumstances. Little has been written on the incidence of lot levies, in other words, on who bears the burden of the levy (see Slack, 1990). The levy is charged to the developer, but depending on when it is levied, how uniform it is across municipalities, market conditions and other factors, some or all of that levy will be passed on to the new homebuyer in the price paid for their house (or on to the pre-development landowner).

- Second, the new homebuyer is also paying property taxes and the same charges for water and sewer services as the homeowners in the municipality who never paid development charges. This implies an element of double counting in charging policies and inequities among homeowners. Exceptions are Peel, Ottawa-Carleton and Durham where at one time there was a double charge rebate -- the levy was reduced by an estimate of the debt financing component of user fees and property taxes as noted above, user rates and property taxes reflect payment of debt charges as well as a capital levy for future expenditures.

- Third, a move from general revenues to development charges means that existing residents enjoy a windfall gain: past generations have partly financed their services and they are not responsible for financing the services of new residents.

With respect to efficiency, development charges need to be based on marginal cost pricing to result in efficient land use decisions. In other words, the true cost of different types of developments on a municipality should be taken into consideration by the developer when making development decisions. In terms of efficiency with respect to use of the facilities, development charges do not have any impact as they only cover capital costs; in terms of the provision of services, the standards are generally set by municipal (or provincial) governments and not development charges.

In addition to development charges, customer contributions can take other forms: servicing by subdividers, frontage and connection charges and local improvement charges. In all cases, future customers are required to contribute towards the capital costs of water and sewer as well as other facilities.

5. Debt Financing

Another method that municipalities can use to make capital expenditures is through the use of borrowing. This section considers trends in the use of long-term borrowing by municipalities and the restrictions placed on municipal borrowing by the Province. It addresses the implications of these restrictions for the future use of debt financing.

Trends in Long-Term Borrowing

Table 8 shows that the pattern of financing capital expenditures in Ontario municipalities has changed significantly over the last decade. In particular, the proportion of total operating expenditures accounted for by long term debt charges has fallen from almost 37 percent to 26 percent for sanitary sewers; from

over 64 percent to 57 percent for storm sewers; and from 24 percent to almost 15 percent for water. Total net long term liabilities for water and sewers fell from over $1.2 billion in 1980 to just over $1 billion in 1987 (MARS database, current year dollars).

In a recent Ontario Budget (1989), it was suggested that total municipal debt charges in 1987 were well under the OMB guidelines and municipalities have sufficient scope to increase their debt for capital purposes. Debt capacity is generally measured by the ratio of debt charges (principal plus interest) relative to current operating expenditures. Under OMB guidelines, this ratio is limited to a maximum of 20 percent for the majority of municipalities, and to 25 percent for rapidly growing municipalities. The debt ratio in the OMB guidelines includes, not only servicing costs on present debt, but also an estimate of the debt servicing costs of certain types of future capital obligations.

On average, municipalities in Ontario are well below the 20 percent limit. For example, in 1986, debt charges relative to total operating expenditures for all municipalities in Ontario was only 7 percent.[14] However, for regional municipalities where the majority of infrastructure expenditures are made, this ratio is higher and consequently the capacity to borrow is somewhat less. For the regions, excluding Metropolitan Toronto, the ratio of debt charges to total operating expenditures in 1986 was 7.5 percent. In some specific regions, the ratio is higher: Halton -- 9.3 percent, Niagara -- 9.6 percent, Sudbury -- 9.0 percent; Oxford Restructured County -- 9.9 percent (MMA, 1988). However, these estimates only include debt charges on present debt and therefore overstate the debt capacity, as used in OMB guidelines.

In addition to variations in debt capacity across municipalities, it should be noted that the measure of debt capacity is problematic in large part, because debt charges are related to current operating expenditures. These expenditures are not necessarily comparable across municipalities depending on whether services are provided by a municipal department or a separate board or agency, depending on whether the services are provided by the municipal or provincial government (and these change over time), and depending on the control of municipalities over the revenue sources to finance capital expenditures. In terms of this last point, grants from the provincial government for specific purposes are not under the control of the municipality and can change from year to year. Thus, the ability of a municipality to incur debt may not be adequately reflected in the ratio of debt charges to current operating expenditures.

At the same time that there has been a reduction in reliance on long-term borrowing, however, municipalities have increased their contributions to reserves and reserve funds. Indeed, as the 1989 Ontario Budget notes, municipalities are using more advanced planning for future capital needs as reflected in the trends in operating expenditures: the fastest growth in operating expenditures over the last decade is accounted for by transfers to own funds. However, only a portion of the funds in reserves are specifically earmarked for capital expenditures; the remainder are designated for working funds, contingencies, sick leave and other purposes.

What is the difference between borrowing the funds to undertake a project today and setting aside funds for a future project? In the borrowing case, the project is built today and the benefits enjoyed over the next, say 25 years. The project is paid for over the next 25 years through the repayment of the debt and the interest charges. Thus, those who benefit from the facility (users over the next 25 years) are also the ones who pay for it and these charges are generally charged to the property tax or user fees. On the basis of the benefits-received principle of financing public services, this is an appropriate method of financing capital expenditures.

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[14] Ministry of Municipal Affairs. Summary of Ontario Municipal Statistics: 1977-1986. (1988).

In the second case, the use of reserve funds, municipalities argue that they are applying the "pay-as-you-go" principle to financing capital expenditures. By this they appear to mean that they do not undertake a capital project until the funds are available. Taxpayers today and in the near future are paying (through their taxes or water and sewer rates) for a facility that will be constructed in the future and for which the bulk of the benefits may go to others. Thus, one difference between long-term borrowing and the use of reserve funds rests on who receives the benefits and who pays the costs. The other differences relate to the risks involved in borrowing funds as opposed to investing funds for future use.

Restrictions on Borrowing

Municipalities in Ontario have no inherent power to borrow money. Rather, the power to borrow is governed by the Ontario Municipal Act. Under the Municipal Act, any capital expenditure which requires long-term financing (where long-term is defined to exceed the life of the current council) requires the approval of the Ontario Municipal Board. The Board's jurisdiction over capital or long-term commitments is governed by the Ontario Municipal Board Act, Sections 62 to 69.

Each year, the Board establishes quotas for capital expenditures for those municipalities that submit frequent applications within a year and establishes permissible debt limits for all other municipalities on the basis of applications received.[15] These quotas and limits are established by reviewing the financial status of each municipality and their capital expenditure forecasts. This material is prepared by the Ministry of Municipal Affairs based on Financial Information Returns. The quotas and debt limits include not only debentures but also long-term commitments and obligations that require the Board's approval, for example, an agreement with the Province for the provision of water and sewer services.

In Ontario, only regional municipalities may issue debentures, either for their own purposes or for the purposes of their area municipalities. The most commonly used method of borrowing, especially by smaller municipalities, is the issue of instalment debentures. These are issued at one time but mature in consecutive years over the period of the loan. Although the payments in each year can vary, the principal and interest payable in later years cannot be substantially greater than that paid in early years.

The Municipal Act specifies limitations on the amount of funds that can be borrowed, the purpose of the borrowing, the number of years until repayment, the class of ratepayers liable for repayment, the currency in which to borrow and other matters. Most authors conclude that the legislation concerning borrowing by municipalities is exceedingly restrictive and prevents municipalities from engaging in many types of borrowing.[16] As examples, four such restrictions are summarized.

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15 Ontario Municipal Board. The Role of the Ontario Municipal Board with Respect to Undertakings Involving Long Term Commitments by Ontario Municipalities and School Boards. (n.d.)

16 See, for example, Peter Rideout. Municipal Debentures in Ontario. (New York: Brown & Co. Inc., n.d.).
and, J.H. Prenger. "Debt Financing: Past, Present and Future", in Federation of Canadian Municipalities, Proceedings of the First Canadian Conference on Urban Infrastructure. (Edmonton: Sodanell Canada Inc., 1987).

1. Municipalities can issue only debentures carrying a fixed rate of interest. One implication of this restriction is that municipalities cannot engage in currency swaps such as an interest rate swap where, for example, the municipality would issue a floating-rate debenture and exchange it for another party's fixed-rate debt. Municipalities in Ontario cannot use swaps to manage long-term debt because they cannot issue floating-rate debt.

2. Municipalities can only borrow funds in Canadian dollars, U.S. dollars and British sterling. There is an exception for large municipalities but they require an Order-in-Council to do so. In all other provinces in Canada, there are no currency restrictions on debenture issues.

3. Municipalities do not have the authority to issue revenue bonds, that is, bonds secured by a charge on certain revenues of the municipality which are segregated for that purpose. Rather, they can only issue general obligation debentures not secured by collateral.

4. Debentures cannot be issued subject to redemption at the option of the owner.

Implications of Restrictions

The main implication of the restrictions on municipal borrowing is that they raise the cost of capital to municipalities. The advantage of allowing floating rate debt is to permit the use of currency swaps, as noted above. These swaps allow borrowers or investors, in theory, to have access to any capital market in the world by exploiting the difference between lenders' views of risk in different markets. The advantages of removing currency restrictions is that the cost of capital would be lowered; the disadvantage is the risk of currency fluctuations. The other restrictions serve to reduce access to capital markets and thus increase the cost of borrowing by municipalities.

Other debt instruments that could be considered for use by municipalities include the following:

(i) sinking fund debentures with balloon features -- these refer to money set aside out of current revenues to repay all or part of the debt issue at maturity. The balloon feature allows an extra large payment in the year of maturity, and by extension, smaller payments in the earlier periods.

(ii) serial bonds -- these are bonds that mature at specific intervals over a period of time. Part of the principal is paid off each year and thus interest payments are reduced.

(iii) zero coupon bonds -- these are non-interest-bearing bonds. The administrative costs are greatly reduced because there would be one annual provision to the sinking fund and one payment to holders on the date of maturity. This can be used to sell debt securities to local residents of the municipality.

Finally, the idea of an investment pool to assist municipalities in their borrowing could be considered. In B.C., for example, municipalities can take advantage of an investment pool under the B.C. Municipal Finance Authority. Rather than borrowing on their own behalf, debentures are issued by the Authority which can borrow more cheaply than can each individual municipality. The major beneficiaries of the pool are small municipalities and it is not clear that large municipalities would be interested in participating. Further study of each of these options is required before any of them could be implemented.

Summary and Conclusion

In the 1990 Federal Budget, grants to provincial governments were reduced in an effort to reduce the federal deficit. In the 1989 Ontario Budget, and even more likely in future budgets, grants to municipalities will also be reduced as a way of reducing provincial debt. The cascading intergovernmental finance system stops at the municipal level. The alternatives available to municipalities to finance water and sewer infrastructure include:

- water and sewer rates;
- property taxes;
- development charges; and
- borrowing.

In the majority of municipalities, a "pay-as-you-go" philosophy is followed whereby water and sewer rates and development charges go into reserve funds (to be combined with provincial grants) to be used for capital works. Borrowing is used to a lesser extent. The result of this financing strategy is that costs are borne primarily through water and sewer rates in the case of existing development and by development charges in the case of new development. For existing development, either the funds are set aside from user rates (before the project is built) or the funds are borrowed (in which case principal and interest payments come out of user rates). In either case, the capital expenditure is paid for out of water and sewer rates (plus grants).

Financing the rehabilitation of facilities in existing developments is somewhat more problematic than the construction of facilities in new developments since, in the latter case, up to 100 percent of the growth-related costs can be funded from development charges. In the case of rehabilitation of existing facilities, municipalities can only rely on water and sewer rates, grants and borrowing.

Case Studies Findings

In order to examine and evaluate current financing and charging approaches in Ontario in greater detail, six case studies were conducted, representing a cross section of municipal and regional circumstances in the Province. Case studies were conducted for the following six jurisdictions:

- the Town of Arnprior;
- the Regional Municipality of Hamilton-Wentworth;
- the Municipality of Metropolitan Toronto;
- the District Municipality of Muskoka;
- the Regional Municipality of Peel; and
- the City of Windsor.

The conduct of the case studies involved a multi-step approach. Available data and historical information on the provision of water and sewer services were reviewed for each jurisdiction, and representatives of the municipalities were contacted and provided with a set of questions. These questions were then discussed in detail during a personal interview. When each case study write-up was completed, it was returned to the local representative for final comments. The results of the case studies appear in summary form below and in detail in Appendix B.

Given the varying circumstances of the jurisdictions examined, it is not surprising that the financing and charging methods applied vary considerably. However, in general, the particular arrangements employed suit the circumstances of each jurisdiction, and take into account, through capital budgeting, the jurisdiction's long-term revenue needs. In the case studies examined, this amounts to several variations of a pay-as-you-go approach. That is, the jurisdictions generally rely on user charges and reserve funds, in addition to Provincial grants and subsidies, to cover their capital and operating costs.

Town of Arnprior

The Town of Arnprior owns and operates its sewage and water treatment plants, and also owns and maintains its distribution systems. All users of water are metered in Arnprior, and are billed a basic service charge according to the size of the meter they use plus a charge per cubic meter on water consumed. Water users pay a sewer surcharge on their water bill, which pays for chemicals used in phosphorous removal during sewage treatment. The remainder of the sewage treatment cost is billed to users as part of their property taxes.

Capital expenditures are funded by debentures and 47.5% grants from MOE. Arnprior has increased its water rates in an effort to borrow less, but has found that revenue increases are less than expected due to a corresponding decrease in water usage. This suggests that there exists a significant price-elasticity of demand for water.

There are no developer charges, but developers must pay for connecting infrastructure. Operating expenditures are covered by water rates, the sewer surcharge and mill rates.

The Town has considered increasing the sewer surcharge on water bills to reflect the total cost of providing sewer services, but because one industrial consumer uses 55% of all water used in Arnprior, this company would bear most of the increase in fees; this would not be acceptable to the Town Council.

Other potential financing approaches are not necessarily practical, because of the small size of the Town and the limited number of users. The current system is considered to work well and no significant changes are expected.

Regional Municipality of Hamilton-Wentworth

The Regional Municipality of Hamilton Wentworth owns and operates three sewage treatment plants and one water treatment facility. Approximately 50% of the Region's households have metered water supply and a program is in place that will have all households metered in 10 years. Current flat rates are calculated in proportion to the assessment of property. Water rates currently decline with increased volume, but the Region intends to have a uniform rate in place in two years.

Hamilton Wentworth has a reserve fund for capital expenditures on water and sewer facilities. A draw of funds is amortized over 10 years. The fund is self financing and does not require external borrowing. The Region also has a Lot Levy Reserve and charges industrial and commercial developments a development levy with an extra surcharge for density.

The Region's current financing arrangements are considered to be preferable to other available options.

The Municipality of Metropolitan Toronto

The Municipality of Metropolitan Toronto owns and operates four sewage treatment plants and four water treatment plants. The six individual municipalities within Metro own and operate their distribution and collection systems. Metro charges the municipalities for water and for sewage services (the charge for which is related to the volume of water consumed). Each municipality then bills users and includes a mark-up to cover its capital and operating costs. Water is metered in all areas except the City of Toronto, which applies a flat rate based on the number of outlets in each household.

Significant revenues are derived from surcharges paid by "heavy" industrial polluters and charges paid by waste disposal companies that truck wastes to sewage treatment plants. Provincial subsidies are also significant, as are payments from York Region for the supply of water to York.

Capital expenditures are financed from the following major sources:

- the Water Pollution Control Measures Capital Reserve Fund (for sewer services);
- current water rate revenue (for water supply services);
- debentures;
- Provincial subsidies; and,
- contribution from the Region of York (for water supply).

There is no transfer of money from general tax revenues to the capital or operating accounts for either water or sewage services. Metro is anticipating a major expansion of its debt over the next 4 years to pay for water and sewer construction. Significant increases in operating costs are also foreseen. Metro predicts that it will be able to meet all of these requirements out of current revenues. By 1994, user charges will be paying 100% of the water supply costs (capital and operating) and 87% of the sewer costs (capital and operating).

Metro Toronto does not charge lot levies, but they are being considered. While public utilities are not considered to offer advantages over the current system, there is some interest in the idea of public/private partnerships.

District Municipality of Muskoka

The District of Muskoka owns six sewage treatment facilities, each serving relatively small populations, and seven water treatment plants. Water is generally metered everywhere except MacTier. There are some declining block rates, but these will likely be phased out.

Many properties are not served by water and/or sewer services. Wells and purified lake water are used for water and septic tanks for sewage.

Urban Service Levies, which exclude most cottages, which appear on the tax bill, are in addition to water and sewer use charges billed separately by the District.

Capital expenditures are funded through:

- grants from the province
- various reserve funds
- debentures
- development fees

The use of non-usage-sensitive charges to derive a significant part of water and sewer revenue is considered appropriate and equitable because this reflects the value of potential use at any given time in the future, even if use is minimal, as in the use of seasonal cottages.

Regional Municipality of Peel

The water and sewage treatment plants, major trunk lines, pumping stations and reservoirs are owned by the Province. Local distribution is owned by the Peel Region, which bills users directly for water and sewers. The Region bills according to a policy of full cost pricing, defined as pricing to cover all costs less provincial grants. Average cost pricing is used, and a replacement program is also factored into the rates. 95 percent of households and businesses are metered, and the Region is experimenting with computerized, remote metering, which could allow billing according to marginal cost.

Sources of revenue for capital are: provincial grants, development charges (lot levies), current contributions (portion of water and sewer rates) and the issuing of debt. No water and sewer expenditures (capital or borrowing) are financed out of property taxes. Borrowing is considered undesirable on the grounds that it is costly to the Municipality and reflects poor management, since interest costs must eventually be covered by user rates. To the extent that some borrowing is required, zero coupon bonds and, perhaps currency swaps would be preferred methods.

There is little interest in involving the private sector in the provision of water and sewer services.

City of Windsor

Sewage

The City of Windsor owns and operates its sewage treatment plants and distribution system. The City retails sewage services directly to users, billing through property taxes. The City also wholesales sewage services to several surrounding municipalities. Homes not connected to sewers are charged a fee to treat the sceptic. Windsor also has an extra-strength sewer surcharge for industrial users, and the City charges the landfill for treating leachate.

A sewer surcharge to be added to the water bills of users has been considered, but, in the past, not recommended for two reasons: the annual administrative cost that would be charged by the PUC would be large; and, there would be a shift in the burden of the sewer charges from commercial, industrial and business users to residential and property tax exempt users.

The City would consider some kind of public/private partnership in the operation of the sewage system. City officials suggested that revolving funds might be a good idea if municipalities could borrow money at the same rate as the Province.

Water

The Water Division of the Windsor Public Utilities Commission operates the retail distribution system. All residences, commercial users and industries have meters, and rates are set according to capital and operating expenditure needs, both current and forecasted. A single rate applies for all users, plus a fixed charge to each user based on the size of the meter. In addition, there is a summer levy, which is a higher rate applied to the amount of water used during summer months that is greater than that used during the winter. Rates are based on average cost.

The PUC plans to issue $90 to $100 million in twenty year debentures for a new capital construction and rehabilitation program, and considers the 15% grants from the MOE to be critical to its capital expenditures.

The purpose of this section is:

- to identify the groups of individuals, businesses and organizations that participate in the provision or use of water and sewer services, or are affected by them;
- to describe the types of benefits and costs that accrue to those groups;
- to discuss pricing strategies that are consistent with economic efficiency and the described benefits and costs.

In the first purpose defined above, we have used the verb "participate" instead of "benefit", as some groups affected by water and sewer services may accrue costs as well as benefits. The word "beneficiaries" used in the study title, should therefore be interpreted in a more general sense as meaning "participants".

In discussing pricing strategies, this section examines:

- the net benefits that accrue to the participants;
- the financial and non-financial costs that accrue to them;
- the ways in which non-financial costs can be transformed into financial costs; and
- the ways in which the financial costs of the services can be recovered from those participants who benefit from the services.

The discussion is presented in eight parts. In the first two parts below, the framework and terminology of the section are defined. They are followed by a description of benefits and costs. Next, economically efficient pricing strategies are discussed. In concluding the section, comments are made on such issues as cross-subsidies and untraceable costs.

Some of the issues discussed in the first two parts of the section may be considered "textbook" material. They are nonetheless necessary to ensure a consistent terminology throughout the study and to establish a logical analytical framework that can be easily followed by all readers of our report.

Benefits, Costs and Benchmarks

The assessment of benefits or costs usually implies a comparison of several options, or "cases". In order to present a clear assessment it is necessary to define benchmarks against which benefits and costs are measured. The definition of benchmarks ensures the use of a consistent terminology throughout the study. Without them, the impact of the same activity on the same groups might be defined as a "cost" in one part of the analysis and as a "benefit" in another. For example, when comparing two cases which differ in the levels of sewage treatment, one part of a study may describe a case with a high level of treatment as providing benefits to the public (in relation to a lower level), while another part of the same study may describe the case with the lower level of treatment as imposing a cost on the public (in relation to the higher level). While, depending on one's point of view, both descriptions are valid, the clarity of

presentation can be significantly enhanced by choosing benchmarks at the outset of the study and relating all options to them.

In this study we propose to use a benchmark of (1) no water and sewer services being provided by any level of government and (2) the "status quo" quality of environment.

By choosing the above as the benchmarks, the negative impact of any pollution over and above the status quo becomes a "cost". The ability of residences and businesses to satisfy their water needs and dispose of their wastewater becomes a "benefit". The ability of the public to live in an efficient urban agglomeration as the result of water and sewer services also becomes a "benefit".

The benchmark definitions above are consistent with the principles implied in the accounting statements and statistics issued by the municipal administrations, in which revenues and expenditures are reported on an absolute (zero-based) rather than incremental basis. Thus, the financial costs and financial benefits identified in our study will be consistent with published current and historical expenses and revenues.

Definition of Terms

The terms "benefit" and "cost" are well understood and do not require much explanation. A "benefit" provides increased value or welfare to a person or a group, as a result of which the person or group is better off than before. Conversely, a "cost" implies a sacrifice, as the result of which the person or group is worse off than before.

In our study, we will distinguish between financial benefits or costs and non-financial or social benefits or costs. The former are identical to revenues and expenses. The latter may have a variety of measures, as discussed later in the section.

Almost every activity performed by individuals or groups generates benefits and costs to:

- the individuals or groups themselves; and
- others.

The latter category generates a flow of benefits or costs, i.e., it involves generators and recipients of benefits or costs.

In most activities, individuals and groups that enjoy benefits also incur costs. The objectives of individuals and groups is to maximize their **net benefits**, i.e., the sum total of the benefits they enjoy less the corresponding costs they incur. People try to achieve that maximization, to the best of their ability, within the given economic and social system. The sum total of the net benefits within the system determines the overall welfare of its participants. The benefits may, however, be distributed in many ways, as the benefit of one participant might be a cost to the other.

In this section we distinguish between users of services and non-users.

"Users" make decisions to consume goods or services and enjoy the associated benefits or incur associated costs. Those decisions are usually made so as to generate net benefits (benefits exceeding costs), otherwise the user would not make the choice of consuming the particular goods or services. Conversely,

non-users have no control over the process that benefits users. They are members of the "general public". They may themselves be unwittingly benefitted or be harmed by the process.

The task of all levels of government is to devise a system that increases the sum total of all net benefits that accrue to the individuals and groups under their jurisdiction, observing, however, regional objectives within the total system. It is not the purpose of this section to elaborate on government policies that are aimed at influencing the **geographic** distribution of benefits. Social objectives to maintain a certain quality of life in all parts of a province, and to sacrifice some of the current benefits in the interest of future generations, require policies that strike a balance between achieving ideal economic efficiency (through the optimal **allocation** of resources to desired outputs) and observing broad long-term regional or national objectives (by influencing the **distribution** of benefits).

Our study will address the objectives of economic efficiency and will make recommendations for enhancing their achievement. Our study will also comment on the distribution of those benefits but will stop short of providing any recommendations on that subject. It will, for example, identify differences in the degree of cost recovery among municipalities but will not recommend any measures for achieving uniformity or equalization.

Major Benefits and Costs

Water and sewer services provide good examples for the discussion of benefits and costs.

The supplier of water service, i.e., the **municipal administration**, incurs financial costs when it builds the necessary infrastructure and operates it. Where water is in short supply and might be diverted from alternate uses, there may also be a cost associated with the water itself. Those costs are fully or partially offset by user charges, which are paid by the consumers and are financial benefits to the municipality. In many cases, the user charges are insufficient to compensate the municipality for its costs and **net financial costs** remain. In other cases, the revenues received by the municipality for water service may exceed the costs of providing the service. In those cases the municipality will derive **net financial benefits** from the service.

The net financial costs or benefits of the municipal administrations are ultimately passed on to the taxpayers, as the municipal administration is merely a transfer agency between various sectors of its constituents. All of its incurred costs and benefits are financial.

The **users** of the water service, as final consumers, are the source of all the demand and enjoy its value. They incur a cost when paying for the service. Those costs are identical to the benefits received by the municipal administration. However, the benefits received by the **user** from the supply of water normally exceed the corresponding costs by substantial margins, thereby providing the user with a net benefit. This is certainly true for "basic" services, i.e., for the provision of water for the purpose of drinking, cooking, washing, personal hygiene, etc.. Those benefits cannot be observed directly in quantitative terms. Attempts may be made to measure them in dollar terms by asking the question: "how much money would you accept as compensation in lieu of water?" We will not attempt to answer this question in our study. We will simply make the assumption that the benefits derived by the users from the supply of water for basic personal needs substantially exceeds the incurred costs, i.e., the responses to the questions above would indicate values well in excess of current rates.

The same is not necessarily true for "non-basic" uses of water, such as the use of water for filling swimming pools, watering lawns or letting water run to prevent the freezing of pipes. Such uses of water are largely "discretionary". Industries use large discretionary amounts of water, as various alternatives may be available to them. The issue of discretionary use will be discussed later in the section.

Turning to the "downstream" portion of water and sewer services, the users of **sewer services** incur costs when paying for those services. They obtain substantial benefits, however, by ridding themselves of the waste they produce, instead of letting the waste accumulate on their property. To quantify those benefits wold require the design of an alternate system in which wastewater would be hauled away by trucks to a certain location (as are solid wastes) and disposed of in a manner that is environmentally equivalent to the current system. Saving the costs of such a system would be a measure of the benefits that the users of wastewater services enjoy from the present systems.

Whereas, in the case of industrial wastewater, the benefits derived from disposal through sewer could probably be measured by such a criterion, in the case of residential users the measurement of benefits is more difficult. Alternate disposal methods, as described above, would not be practical or economical. As in the case of water services, the benefits might be equal to the dollar amount that people would pay for getting rid of their wastes in the absence of municipal sewer services or by the amount of compensation they would **accept** in lieu of sewer services. As in the case of water services, our study will not attempt to put a value on sewer services, beyond making the statement that the benefits obtained from those services most probably outweigh the costs incurred by the users.

The next group discussed in the flow of benefits and costs related to sewer services is, once again, the **municipal administration**. It incurs financial costs in building and operating the sewer system and its associated sewage treatment plants. Those costs are offset by the financial benefits obtained by the municipal administration in the form of user charges. As in the case of water service, the user charges, while being costs to the users, equal the corresponding benefits received by the municipal administrations. As in the case of water service, the revenues obtained from the users for sewer services often do not cover the corresponding costs, in which case the municipal administrations incur net financial costs. In other cases, the user charges may over-recover the costs and the municipal administrations may enjoy net financial benefits. Those net costs or benefits are passed on to the general ratepayers.

An important group of participants in the flow of benefits and costs is the **general public** (as distinct from users), which may or may not be adversely affected by the discharge from sewage treatment plants into public bodies of water. In those cases in which sewage treatment is insufficient to ensure an environmental quality that meets local objectives, the public will incur a social cost or "harm". That harm can be eliminated through the improvement of water treatment services and the imposition of controls on discharges at the user level. While the former will cause an increase in the municipal administrations' costs, the latter will increase the costs incurred by the users. In that manner non-financial social costs can be transformed into financial costs.

Beyond potentially incurring social costs, the general public (other than users) may also enjoy a significant benefit from the existence of water and sewer services that makes it possible for a large population to live a high-quality life in efficient urban agglomerations. Such agglomerations would not be feasible without the services. For example, even if some urban residents did (theoretically) not take advantage of water and sewer services, they would still use a range of other services and businesses in the city which, in turn, could not exist without a city-wide water and sewer network.

A special group of beneficiaries are the developers and land owners who have bought un-serviced land on speculation that it will eventually be serviced. When such servicing actually occurs, those landowners

who were selected derive substantial gains while those who were not selected do not. The "winners" may be quite willing to pay for the benefits they received in the form of lot levies (development charges). These are the flows of benefits and costs that may affect developers/landowners and their customers:

- When the land is serviced, the owner enjoys a capital gain. In calculating that capital gain, the accumulated past carrying charges of the property must be considered, calculated at a fairly high interest rate, as substantial risks are involved in the holding of property over an extended period of time. For example, and acre that originally cost $20,000 twenty years earlier, may be worth $100,000 after accumulated interest charges. If servicing the land raises its value to $200,000, the capital gain is $100,000.

- After having made a calculation such as the one above, it is likely that the capital gain will exceed the developer's share of the costs of servicing the property. In that case the municipality may tap into the surplus and charge the developer more than his actual share of servicing costs.

- When a policy, such as described above, is adopted, the prices of new homes are likely to be affected to some extent. Thus, the ultimate user will pay some of the excess charges levied by the municipality on the properties "in front". However, because of the municipalities' increased revenues from increased lot levies, the users are likely to pay somewhat less for water and wastewater services during the years of usage.

The benefits and costs described in this section are summarized in Table V-1, on the following page.

The costs incurred by the municipalities may be recovered from the beneficiaries identified in the discussion above and in Table V-1 in several ways. Two possible alternatives are described in the next section.

Potential "Beneficiary-Pay" Policies

In consideration of the benefits and costs described above, one possible policy that can be envisaged is one in which municipalities fully recover their water and sewer costs from the users and the general taxpayer is unaffected. When the municipalities set their user charges in such a way that their financial benefits equal their financial costs and when the public incurs no environmental cost, i.e., it is not "harmed" by pollution (due to adequate sewage treatment), the remaining net benefits will rest with (1) the users and (2) the general public that enjoys the benefits of "agglomeration" (such as the advantages of urban life) without having to pay for the services that make such agglomeration possible. It is not possible within the scope of this study, to quantify those net benefits and we can only make the statement that they are virtually certain to be positive. The reason for that assumption is the belief that, if necessary, people would not hesitate to pay more than they pay today for a secure and ample supply of fresh water and efficient disposal of wastewater.

It is also possible to envisage an alternative policy that does not recover all of the municipality's costs from the users. A municipality may decide to supplement its water and sewer revenues from municipal taxes. The rationale for such a system would be the aforementioned view that the universal availability of convenient water supply, and the treatment of sewage, makes it possible for people to live a high-quality life in efficient urban agglomerations, which would not be possible without those services. The

TABLE V-1
BENEFITS AND COSTS

PARTICIPANTS	BENEFITS	COSTS
Municipal Administration		
• water services • sewer services	User charges Development charges (Lot levies) Municipal taxes Provincial grants	Capital costs Operating costs
Users		
• "basic" water	Use of service	Basic charge
• "enhanced" water (residential and commercial)	User of service	Incremental charge
• "enhanced" water (industrial)	Ability to produce	Water surcharge
• "basic" sewer	Use of service	Basic charge
• "enhanced" sewer (industrial)	Saving the costs of alternative disposal	Sewer surcharge
Developers/Landowners	Advancement of capital gains	Lot levies Exactions Direct construction expenses
Public		
• affected by urban efficiency	Opportunities, diversity and scale of city	
• affected by taxes		Taxes
• affected by the environment		Substandard water quality Health hazards

services therefore provide benefits to the public at large and, according to this policy, should recover some of their costs from the general public in the form of taxes.

Economic Efficiency

The economic efficiency of a system is maximized when all marginal (incremental) costs are properly allocated to the incremental production of the goods and services that caused the costs, and when the consumers of those goods and services face prices that are at least equal to those costs. The "proper" allocation of costs implies the separation of the long term marginal costs of production from "sunk" or fixed costs.

A "long-term marginal" cost is defined as the increase in the suppliers' capital and operating costs resulting from the next additional unit of consumption. Whereas the marginal operating costs can be calculated with relative ease, the calculation of marginal capital costs is usually more involved.

"Sunk" and/or fixed costs are those costs that are unaffected by incremental production or consumption. They include previously incurred capital costs and the fixed parts of operating costs. To ensure the producers' financial integrity, prices must include long term marginal costs plus components for the recovery of sunk costs. The latter might be recovered in various ways and are usually recovered in a manner that services particular objectives.

In a system in which prices fully reflect all incremental costs people will only increase their purchase of goods and services, and the supplier will only expand services, when the marketplace will find it worthwhile to pay for them.

In the case of public utilities, which provide essential or"basic" services, it is often difficult to apply that principle without qualifications. Users of existing services pay for capital investments made many years earlier. Because of inflation, and because services were frequently provided initially in the least cost-intensive areas, incremental users of services in new subdivisions would normally have to pay higher user charges than the existing users, so as to comply with the principles of economic efficiency. Whereas in some public services it is not customary to maintain different user charges in "old" vs. "new" parts of the same municipality, in water and sewer services it may be easier to apply different user charges to existing and new consumers for the reasons outlined below.

The reasons for the contention above is that some charges for water and wastewater services are included in the prices of serviced land. People normally do not find anything wrong with paying many times more for a piece of serviced land today than what their parents had paid for a piece of land many years ago. The same is true for old vs. new commercial/industrial developments. In other words, adding the capital costs of services to those of the buildings they serve appears to be an economically efficient and socially acceptable approach. Since much of the price increases of "new" developed land have little to do with costs, that is one more reason why the costs of servicing can be "buried" in the market price for land.

Capital costs incurred by the municipalities are, however, not confined to the expansion of existing municipal systems to serve new subdivisions and buildings. There is also a need for replacing certain parts of the existing system, to accommodate increased per capita usage (if it were to occur) and to improve the quality of existing services. A prime example for the last item is the increase in the effectiveness of sewage treatment plants, with the objective of eliminating the social costs of pollution, as discussed earlier. For costing and pricing purposes distinction must therefore be made between the costs of upgrading a

sewage treatment plant to be more effective with respect to the quality of the effluents, and the costs of expanding it in order to handle larger quantities of wastewater.

One option for recovering the incremental costs of existing services is a system of user charges that would uniformly affect all types of usage. Another approach might be the division of water and sewer services into"basic" and "discretionary" or "enhanced" services, and to pose different user charges on each. The reason for the proposal would be the contention that "basic" volumes of usage are not sensitive to price, whereas "discretionary" volumes of usage are. Consequently, while the former cannot be influenced by price, the latter can be conducive to conservation, and the reduction of municipal expenditures, through pricing.

"Basic" services might be defined as those needed by consumers to satisfy their basic expectations of comfort and convenience. "Discretionary" services may include the usage and disposal of water in excess of the basic needs. Examples of the latter in the residential sector are the filling of swimming pools, the frequent watering of lawns, etc..

It is probably not possible to rigorously separate basic consumption from discretionary consumption in the residential sector. A practical approach would be a survey of water bills for a sample of metered customers over many successive billing periods and to identify those portions of the consumption that fluctuate seasonally or fluctuate randomly by excessive amounts.

In industry, "discretionary" or "enhanced" services may be defined as those delivering larger than normal amounts of water and/or handling special types of wastes. In industry, economic efficiency would require all costs of production to be reflected in the price of the products. Economic efficiency would therefore require that the incremental costs of water and sewer services be charged to the costs of production.

The Pricing of Services

As indicated, when the prices charged for water and sewer services are at least equal to long-term marginal costs the users of the services will be prevented from causing their municipality financial losses by increasing their consumption (i.e., requiring the construction of new facilities that cost more than what the users pay for the incremental volumes that made the facilities necessary). For example, if the addition of new water wells to the system were to cost more than the marginal cost increase associated with marginal production, every cubic meter of incremental consumption would cost the taxpayer more money.

The basic approach to calculating marginal costs consists of an estimate of the capital costs that would be required at current construction cost levels to accommodate a certain growth in the consumption of services by existing consumers. Those capital costs would then be allocated to each unit of consumption that was made possible by the expansion of the system. The costs should be allocated to all quantities handled during the life of the additional plant.

In the next paragraphs, we discuss the pricing issues affecting existing and new consumers under separate headings.

Existing Consumers

If long-term marginal costs were charged for **all** units of consumption the service supplier would probably find an under-recovery or over-recovery of current expenses. That is due to the combined effects of inflation and economies of scale (i.e., to the fact that marginal costs do not equal average costs).

As noted, the supplier has sunk and/or fixed costs which do not increase with increased production or consumption. Prices that are equal to marginal costs may therefore not be sufficient to provide full cost recovery. In contrast, inflation might have increased current marginal costs to such levels that a price structure based on current marginal costs might generate more revenue than needed.

If prices based on long-term marginal costs were to produce revenues **below** the municipality's revenue requirements, the prices can be simply raised to the required level. However, if the charging of long-term marginal costs were to produce revenues **in excess** of the municipality's revenue requirements, an across-the-board reduction of prices may cause economic inefficiencies, as it would encourage people to increase their consumption in the "discretionary" sector and, with each additional unit of consumption, impose an additional financial burden on the supplier of the service.

An alternative pricing system would divide the services provided by the municipalities into "basic" services and "discretionary" or "enhanced" services. As noted earlier, it is believed that the benefits obtained by the users of "basic" services exceed their related costs by a significant margin. Basic services can therefore be assumed to be practically insensitive to price (as all goods and services that are greatly underpriced)[17]. For that reason, considerable flexibility exists in the pricing of those services.

Charging more for the basic consumption than for discretionary or enhanced consumption is socially less desirable than charging equal rates for all levels of consumption, or actually charging more for enhanced consumption. It depends on policy whether it is more appropriate to charge any deficit remaining after the recovery of marginal costs to the basic residential consumer or to industry.

If discretionary or enhanced services were to be charged at rates that are different from those charged for basic services, the latter may be:

- flat rates; or
- metered rates.

The design of a proper structure requires an estimate of the level of consumption that might be considered basic, or non-discretionary, for dwellings or businesses of varying sizes or nature. If properly estimated, most users would exceed the "basic" threshold and, therefore, there would be little difference between a flat or metered system up to the "basic" level. Metering the discretionary or enhanced consumption would be a prerequisite for the suggested two-tier system.

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17 Example: if the price of an airline ticket from Ottawa to Toronto were 50 cents, the demand would not change if the price were raised to $1.00.

New Consumers

New consumers would typically be home buyers in a new subdivision, tenants in a new office development, or a new industrial plant. It is the practice in some Ontario municipalities to impose direct levies on developers (primarily developers of residential subdivisions), with the objective of recovering all the capital costs associated with their project. Whereas the developers might build some of the water and sewer infrastructure themselves, the municipality would typically impose an additional lot levy on the developer to recover those capital costs that the municipality has to put up in order to augment its services.

Whereas the "front-end" recovery of the capital costs that are related to the physical plant required for the **direct** servicing of a new development is a fairly straightforward process, any component of the lot levy that relates to the need for expanding the **total** system raises some conceptual problems. It was noted in the previous sub-section that user charges should include a component for the capital costs of total system expansion. If such a component were to be levied on new developments "in front", there might be an element of double counting in the calculation of subsequent user charges.

The appropriate approach might be the examination of precedents in the particular municipality. If the inclusion of future expansion costs in the "front-end" lot levies has been practised for some time, the criterion of equity among consumers would required the continuation of that approach. Using that approach, long-term marginal costs would be calculated in consideration of the levied that have already been collected "in front". Consequently, there would be no double counting.

In those municipalities in which the costs of total system expansion had not been traditionally included in the calculation of lot levies, the introduction of that practice would cause a problem, as new consumers may be charged higher total amounts than existing consumers. This would occur as long as ongoing charges remained the same for all consumers: new consumers would than be subject to element of double counting.

For example, homeowners in part of a city that was built at a time at which lot levied were not customary would pay for the entire infrastructure associated with their property "as they go", while homeowners in new subdivisions would reimburse the developers for lot levies when they buy the house and than pay "as they go" the same amount as their counterparts in the old part of the city (regardless of the initial contributions).

Cross-Subsidies

A municipality may decide to consciously apply cross-subsidies with the objective of supporting economic development. They may provide such cross-subsidies within the flexibility provided by legislation. Whereas such subsidies may be detrimental to economic efficiency, the municipality may consider other objectives to be more important than economic efficiency.

One form of cross-subsidy may be between industrial sectors and the non-discretionary residential sector. An example would be cross-compensation of some business to aid in the enforcement of MISA requirements. Some aid may go to small electroplating, dry, cleaning, automobile repair or other businesses. Some of those businesses claim that they would no longer be viable if they had to pay the full costs of waste disposal. It can therefore be suspected that some of those businesses may use illegal discharges into the sewer system to avoid going out o business. Consequently, a subsidy system might be designed that would provide a disincentive for discharging toxic chemicals into the sewer system. The cost

of those subsidies may then be recovered from the "least elastic" consumer sector: the basic residential and small-business sector.

Another category of cross-subsidy may exist among individual municipalities. If the Province of Ontario decided that people in the Province should pay user charges that are closer in magnitude to each other than the differing service costs currently experienced among Ontario municipalities, it may introduce a system of geographic cross-subsidy. Such a system may reduce economic efficiency but would serve the potential objective of promoting a more evenly distributed growth across the Province than "natural" growth and dampen the trend toward over-concentration.

Untraceable Costs

Some of the costs imposed on the water and sewer system are untraceable. A prime example is represented by storm sewers that might be used intentionally for the illegal disposal of waste, or might serve as receptacles of urban runoff.

As it may be difficult to apply the"user pay" principle to those cost, they may be recovered from the following sources:

- municipal taxes;
- provincial subsidies;
- fines for illegal discharges;
- from the basic residential and small-business users;

or from a mixture of the above. Covering those costs partly form municipal or provincial taxes might be justified by the contribution of storm sewers to the protection of roads, which are financed by the levels of government that collects the taxes. Alternately, basic users might carry some of the burden as they are believed to enjoy substantial net benefits and their consumption is not very sensitive to prices.

Summary and Conclusions

First, the capital expenditures required for system growth are addressed.

New subdivisions and their occupants are responsible for growth. Consequently, the payment of lot levies related to new subdivisions is consistent with the "beneficiary pay" principle. The advantage of that form of payment is also in compliance with the principle of "matching", i.e., a lumped fee is paid for a lumped expenditure. It should be noted that not necessarily all of the lot levy would be passed on by the developers to the occupants, as developers may have to absorb some of the increase in their own costs. However, it was shown that developers are also beneficiaries of the water and sewer system and, therefore, the "beneficiary pay" principle would still be maintained.

Next, the recovery of operating expenses and of capital expenses related to renewal and repair are addressed.

As discussed in the report, a certain portion of water and sewer usage is not discretionary and is, therefore, practically non-elastic. A significant portion of the water and sewer usage is, however, discretionary and, therefore, usage will depend on price. Certain residential and commercial users, and significant portions of the industrial users of water and sewer services are in that category. The different characteristics of the two different types of usage indicate an advantage to separating the two types in the pricing approach. That can be accomplished through special studies that would determine a typical amount of non-discretionary water and sewer usage in an average of typical residential, commercial and industrial establishment.

The rates for the discretionary block of usage might be set so as to match long term marginal costs. The advantage of that approach is that it enhances economic efficiency where long term marginal costs are in excess of average costs, this pricing system also enhances conservation. However, long term marginal costs may, in some municipalities (particularly in those with substantial recent growth and relatively new infrastructure) long term marginal costs may be lower than average costs.

After the recovery of some of the costs from lot levies and from revenues generated by the discretionary portion of usage, the remaining costs could be either recovered from a "basic" portion of usage or from municipal taxes. Either of those are paid by practically the same people and establishments. If the recovery from water rates and sewer surcharges was chosen as the more advantageous alternative, the rates for the discretionary or "top" block of usage might be either higher or lower than the rate for the basic block. The former case would represent a departure from traditional rate structures in Ontario: however, there are certainly many examples for increasing block structures in other North American locations at which long term marginal costs are lower than average costs, the municipality may nonetheless consider a top rate that is not lower than the rate for the basic block, for the purpose of conservation.

Another alternative for those locations in which long term marginal costs are lower than average costs would be an opposite move: the reduction of rates for the basic block of usage to the level of long term marginal costs, and the recovery of the deficit caused by that reduction from municipal taxes. As the users of basic water and sewer services and the taxpayers are practically identical, the issue whether the cost recovery should be achieved from water rates or taxes is an issue of policy and must be determined by each municipality in consideration of all relevant factors. Essentially, recovery from taxes represents a progressive method of recovery, as wealthier people would pay more, while recovery from water rates would put a uniform burden of all ratepayers. One advantage of recovering at least some of the costs from taxes would be the recognition that in an urban environment residents benefit not only for their own usage of water and sewers but also by the fact that others in the city can use the services, and therefore, can set up their businesses in the city which, in turn, benefit everybody.

A matching of the ways in which ratepayers make use of facilities and the rates they pay indicate advantages of a charging system in which there would be a minimum charge up to a certain amount of usage which the users would have to pay regardless of the actual attainment of that minimum usage. That pricing approach would reflect the fact that a significant benefit provided by the water and sewer services is the availability of the service at all times, i.e., their ability to be "ready to serve" even if people make no use of them at certain times.

The conclusions above implied the assumption that all services are provided at the environmental standards set for the community as reflecting the desires of that community. The assumptions implied that the costs associated with the achievement of the desired standards will be included in the calculation of total costs, both average and marginal.

The practical implementation of the alternatives described above require cost separation studies and the application of specific costing methodologies. First, the capital costs associated with growth must be separated from the costs associated with renewal and repair, in order to separate the revenue requirements from lot levies as opposed to usage charges. Second, long term marginal costs must be estimated separately from average historical costs in order to implement the multi-tier system previously described.

In calculating long term marginal costs it is usually necessary to annualize capital costs, which represent the "long term" aspect of the costs. An advantageous method for doing that is the approach normally applied to mortgage payments in which both principal and interest are recovered in such annual instalments that the sums of the two are constant in all years. That method is being used by the Regional Municipality of Hamilton-Wentworth, presented in the Appendices.

As demonstrated in earlier sections of this report, municipalities across Ontario currently use a combination of revenue sources to fund capital and operating expenses of water and sewer works. Revenues can be derived from a combination of user fees, taxes, grants, development charges and/or exactions, and borrowing.

A strength of the current approach in Ontario is that each municipality can, in theory, design a financing system that best suits its particular requirements. A weakness of the current approach is that the traditional means of financing may no longer be appropriate or sufficient to meet the investment demands of aging infrastructure, an expanding population and more stringent environmental regulations. An additional complicating factor for Ontario's municipalities is that the Province has signalled its interest, through Provincial budget statements, in having the municipalities pay an increasing share of their infrastructure expenditure requirements. Different approaches to financing water and sewer services in Ontario may have to be considered.

In this section, we identify and assess a variety of approaches to financing and administering water and sewer infrastructure. None of these approaches is truly "innovative" in the sense of bringing an entirely new perspective to bear on the financing problem. Indeed, given the long history of the provision of municipal water supply and sewer services, there probably aren't many approaches which haven't been thought of before. The discussion in this section focuses on approaches which are currently receiving renewed attention throughout North America as municipalities struggle with the dilemma of providing better services in times of financial constraints.

This section makes reference to U.S. experiences and experiments with infrastructure financing. Some of these approaches could be tried readily in Ontario; others would require regulatory changes. U.S. examples are presented because of the wide range of published materials available on U.S. municipalities' approaches to the issue and because of the longer period of time over which U.S. municipalities have been dealing with environmental programs like Ontario's MISA.

The Need for Responsible Fiscal Practices In Meeting Capital Requirements

Financing water and sewer services can be based on a combination of allocations from the general municipal budget and beneficiary-based fees. However, innovative financing is predicated on a shift away from reliance on general governmental revenues or subsidization and towards "responsible fiscal practices."

These generally include:

- Full-cost (or cost-of-service) pricing, where rates are charged that reflect the total cost (direct and indirect; capital and operating) of providing the service;
- Recovery of costs through fees for service based on types and amounts of service received by or demanded from different user groups; and
- Accountability for services through enterprise fund accounting, in which project revenues are segregated from other municipal flows of funds and dedicated strictly to the service for which fees were collected originally.

Full-cost pricing and recovery of costs through fees for service (rather than general tax revenues) are important because they:

- Encourage more efficient allocation of resources. That is, they discourage excessive use of infrastructure and scarce resources; and
- Encourage greater private participation in public works by providing a more secure source of revenue (because subsidies are subject to political and budgetary pressures).

On the other hand, subsidization from general tax revenues can be justified in some cases as public reimbursement for externalities created by public works such as wastewater treatment where individual health benefits are not proportional to use (generation of wastewater). Additionally, some argue against full-cost recovery from fees because the charges are regressive and would pose too great a burden on low income users. These special needs can be met with programs such as "lifeline" rates or direct income subsidies based on means tests. This can be more efficient economically than rate subsidization for all users regardless of ability to pay.

Combining Innovative Financing and Administrative Arrangements

Instituting new financing implies not only innovation in developing new payment methods but also innovation in organizational and administrative structures to insulate these public works from the general government budget process. The structures associated with innovative financing distance infrastructure revenue sources and expenditure decisions from general government, establish a more direct connection between sources and uses of funds, and, in many cases, include private participation. Five general approaches can be delineated:

- *Special Financing Districts* - distinct geographical areas created within a political jurisdiction in order to raise money from property owners for stated needs.
- *Exactions* - money, land, or construction services and materials provided by a developer or property owner to a public jurisdiction in support of public works investment.
- *Utilities* - independent public corporations established to construct, operate, and maintain public works.
- *Public-Private Partnerships* - working relationships in which public and private interests share ownership or certain features of ownership in public works.
- *Revolving Funds* - a system whereby an initial infusion of capital is loaned to qualified facilities; as the loans are repaid, new loans are made, hence the fund "revolves."

There are links between method of payment, structure, and funding. For example, private participation is more likely when facilities are legally and financially autonomous, and when they implement full-cost pricing. Autonomy also facilitates debt financing in the United States since independent governmental jurisdictions (for example, special districts) can issue their own debt without affecting municipal debt ceilings and bond ratings.

Special Districts

Special financing districts are areas created to finance specific projects within the district. District projects can be funded through debt or on a pay-as-you-go basis; equity and intergovernmental transfers can also be a part of the financing package. Payment is either through extra fees collected in addition to regular jurisdiction-wide property, sales, and income taxes (special assessment districts) or through a diversion or earmarking of taxes to a project fund (tax increment financing districts).

While state and local legal requirements vary, creation of special districts involving extra fees (special assessment districts) usually requires some form of prior approval by district property owners -- a simple majority of owners, for example, or agreement by owners who control a majority of the land area, or owners responsible for a majority of the fees assessed. Thus, unless mandated to protect public health or safety, such incremental fees are essentially self-imposed or sanctioned by the landowners themselves.

Characteristically, once such a district is approved by the required proportion of landowners, participation in special assessment district financing is mandatory for all landowners. One exception is Fort Collins, Colorado in which district supporters can only negotiate repayment arrangements with non-supporters, but cannot force their involvement against their will.[18]

Landowners involved in special assessment district financing may be residents desiring infrastructure improvements, developers interested in readying property for major projects, or commercial establishments helping to finance improvements expected to enhance local economic activity. In general, assessments are based on those property attributes which are assumed to be directly proportional to benefits enjoyed by the property owners. That is, fees are beneficiary-based, using proxies for benefits received such as property values, front footage, square feet of buildings, etc. Road utility districts in Texas base assessments on property value (Apogee, 1987). The special assessment districts in Pleasanton, California, on the other hand, calculate assessments on the basis of acreage (See Pleasanton case study, Apogee, 1987, p.p. 35-39).

Special assessment districts can be dependent extensions of the local government created only to raise revenue for projects administered by the local government. Or, they can be independent of the local government, having nearly complete autonomy to finance, construct, and manage specific projects. Special assessment districts created in the United States to finance construction of major infrastructure are generally granted the power to issue their own bonds; annual assessment revenues are used for debt service and amortization. For example, the special taxes levied by Texas road districts (Apogee, 1987, p.31) are geared to the debt service schedule. Other districts, such as Pleasanton, California allow landowners to pay assessments in multi-year instalments which, in turn, are used for debt servicing. In both situations, the expected revenue streams can be used as security for bonds which provide capital funding for the projects.

Another recent innovation used in the United States is an equity-like instrument for infrastructure funding called certificates of participation (COPs) or equipment trust certificates (ETCs). These are financial instruments backed by physical assets. Technically, these are equity forms since investors "own" a specific public works facility through their purchase of COPs or ETCs. However, the certificates are structured and treated as debt instruments -- payments to certificate holders are at fixed rates of return or interest levels. In some ways, they are analogous to mortgages but, rather than being issued by a single lending

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[18] See Fort Collins Case Study in, Apogee Research. Financing Infrastructure: Innovations at the Local Level. (Washington, D.C.: National League of Cities, 1987), p.p. 58-60.

bank, the mortgage is shared among a number of individual investors without ties to each other. The infrastructure itself is held by a trustee as collateral and the user makes lease payments which, in turn, are used to pay "debt" service.

Certificates can only be issued to fund physical capital which is suitable as collateral and only in jurisdictions in which local authorities are allowed to negotiate long-term leases. Therefore this approach is not universally applicable. Like other bonds, it is a means to bridge the gap between immediate need and future revenues; it is not a resource-generating approach. Thus, repayment methods must be evaluated at the same time as the use of certificates is considered.

A form of special district in which no additional fees are collected from landowners is the tax increment financing or TIF district; funds for defined programs are raised by diverting part of regularly-assessed property taxes[19] to special project accounts. Revenues equal to those collected in the base year (prior to growth and new development) continue to be deposited in the jurisdiction's general fund. Any increment in tax revenues however, is deposited in a special fund for debt servicing (e.g., on revenue bonds floated) or otherwise reimbursing the local community for growth-promoting investments made.

TIF districts are financial extensions of the government jurisdiction which created them; they are not politically independent. District revenue is dependent upon increases in assessed property values (or, in the case of Rockford, Illinois, upon increased sales volume of district business). Thus, such districts are suitable when significant development or redevelopment is anticipated. TIF districts have been used to service debt incurred for highway intersections, urban renewal, and other infrastructure constructed adjacent to or within the TIF district. TIF revenues cannot be invested off-site, thus are unsuitable for water and wastewater treatment facilities that are expanded elsewhere to accommodate new development within a potential TIF district. TIF districts could be used for dedicated facilities constructed within the district to serve district properties.

The advantage of special financing districts is the close and clearly visible tie between the infrastructure constructed or maintained and those who pay for it. A particular advantage of special assessment districts is the flexibility allowed. Assessments can be tailored to circumstances; for example, they can be at the same rate for all within the district or can vary if it is felt that benefits vary among participants according to location or other variables. One argument in favour of uniformity is that variations are more likely to lead to disputes.

In districts that base fee assessments on property attributes such as land area or street frontage, the relative burden of each type of property remains unchanged. Assessments based on area of finished buildings or property value, however, shift the relative burden over time from undeveloped property to developed property. This may place an undue strain on those landowners in the forefront of development particularly if other landowners lag behind more than expected. If such disparities are accompanied by economic recession, some landowners could be forced into bankruptcy if assessment levels are too great.

Disadvantages of special assessment districts include the likelihood of altering the economic decisions that would have occurred without such fees. In particular, the effect on development must be considered (see the discussion of market sensitivity in Section VII). TIF districts are not characterized by this disadvantage since they do not involve additional fees. A disadvantage of all special financing districts is

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[19] Property taxes are the traditional source of revenue in TIF districts. However, a TIF district set up in Rockford, Illinois, used incremental sales tax revenues instead to underwrite the designated investments.

the possible perception that property owners within the district are receiving preferential treatment in the form of new or improved infrastructure. This may be particularly true for TIF districts in which district landowners pay taxes at the same rate as the general population.

Exactions

Exactions may be generally defined as money, land, or construction services and materials provided to a public jurisdiction by a developer in consideration of infrastructure needs. In this approach to financing public works, the administrative structure is provided by the local jurisdiction. Exactions may be seen as a type of one-time user fee -- developers contribute to the jurisdiction to compensate for the increased burden their development will place on the infrastructure. A developer may offer exactions voluntarily to expedite project approval or completion. Or, exactions may be an "entry charge" required by local jurisdictions as a prerequisite for building. Jurisdictions are using their bureaucratic clout and legal leverage -- their power to withhold building permits, for instance, until developers satisfy certain conditions -- to force new entrants to absorb at least part of the incremental burden they impose on infrastructure.

Traditional exactions include land dedications for rights of way, parks, and the like, and cash payments in lieu of land, usually to support transportation needs. Exactions have been expanded in recent years to include donations of specified facilities, construction of off-site infrastructure such as intersections and roads adjacent to the development, and formula-based special fees. Exactions in kind could include, for example, roads or site preparation for water and wastewater treatment, or provision of water distribution and sewer collection segments.

Exactions may be negotiated individually. For example, developers interested in annexing their developments to the city of Aurora, Colorado, must negotiate the terms of annexation individually; negotiation includes delineation of roads, parks, or other infrastructure that the developers must provide at their own cost as a condition for annexation. Until called into question recently, developers in northern Virginia "preferred" exactions in kind such as highway interchanges or access roads to expedite construction of infrastructure critical to their developments or to alleviate anticipated infrastructure bottlenecks that threatened approval of their projects.

Exactions may also be assessed on a systematic basis according to an established formula legislated by local or state authorities. In the latter case, developers are required to pay impact fees or special taxes to compensate the local community for provision of off-site services and infrastructure in addition to any on-site infrastructure required by local building codes. These are one-time capital charges which are directed to investment in the designated infrastructure. Orlando, Florida, assesses impact fees to compensate the local water utility for extra capacity needed to service the new development.

Impact fees are growing in importance as a financial source for infrastructure. Florida State University professors Downing, Lines, and Frank conducted a 1984 survey of 1,718 public works directors in United States municipalities of 15,000 population or greater. Of these, 190 were using impact fees for construction of sewage facilities. Revenue, which averaged about $690 per typical single-family home, was invested in additional capacity in treatment plants and major transmission facilities, but not in collection networks.[20]

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[20] James E. Frank, Elizabeth R. Lines, and Paul B. Downing. A National Survey of Sewer Impact Fees (Tallahassee, Florida: Policy Sciences Program, Florida State University, 1985).

Impact fees differ from special assessment district fees in three major ways:

- Revenues from special assessment districts are restricted geographically while impact fee revenues may be used anywhere in the collecting jurisdiction;
- All property owners within a special assessment district pay the specified fees whereas only new development is assessed impact fees;
- Impact fees for all new entrants in the jurisdiction are fixed at the same rate whereas fees in assessment districts may vary within the same district and from district to district within the same jurisdiction; and
- Impact fees are imposed by the local jurisdiction and do not require prior approval by participating landowners.

Specified impact fees often follow a period of negotiated exactions. When exactions are negotiated individual circumstances can be considered -- the desirability of the project or the developer's ability to pay for example. However, negotiations take time, outcomes are uncertain, and variations among exactions may create ill will among developers as well as the public. The use of standardized impact fees has the advantage of equality of treatment, but at the expense of flexibility. The move to impact fees usually occurs because the administrative ease and equality of treatment of impact fees is considered more advantageous than the flexibility of negotiated exactions.

In both cases, a successful program of exactions requires strong demand for development in a given area or else a community content to suffer reduced growth to maintain a balance between demand and supply of infrastructure. The advantage of exactions of all kinds is the ability to shift at least part of the burden of development to the new entrants that create the infrastructure bottlenecks.

Utilities

Utilities are a type of independent special assessment district created to oversee all aspects of a particular public works system including financing, construction, and operation and maintenance. They are autonomous public corporations answerable to local governments. Utilities may be distinguished from other independent special assessment districts by their greater duration, geographical breadth, and functional scope.

Utilities are not created for a limited duration such as the infrastructure construction period but are assigned perpetual responsibility to operate and maintain the particular public works facility. In addition, utilities are not established for selective neighbourhood components of a public works system; the whole generating and distribution structure is usually included. Finally, utilities handle all decisions concerning financing, personnel, and administration directly; these are not delegated to another governmental department.

Most public works utilities charge one-time connection fees for capital costs plus regular monthly or annual fees for operations and maintenance. Some utilities also assess periodic capital fees along with user fees. The base unit used to calculate each fee depends primarily on the particular public works involved.

Utilities function well in both high and low growth areas. Their advantage is in allocating costs on the basis of use of the particular public works system and, because of their autonomy, in insulating their expenditure and long-term planning decisions from the uncertainties of general revenue budget pressures. These advantages, however, are related to full-cost pricing; significant subsidization would seriously undermine these advantages. The ability of utilities to adequately provide for capital needs depends on the fee structure instituted; the impact on development itself depends on market response to fee rates and types.

Public-Private Partnerships and Equity Arrangements

While most of the financial techniques discussed here involve public-private cooperation, some rely on direct participation by one sector (public or private) in a venture controlled by the other sector. In these cases, money or services are contributed in exchange for enjoyment of certain rights or future income.

Private participation in public works can take a variety of forms ranging from private design, construction, and operation of a public works facility under public overview to contracting out in which the private partners assume a smaller share of the risk and a limited capital burden. More specifically, public-private partnerships include:

- Contract services - the private partner is contracted to provide a specific municipal service or to maintain and operate a facility such as a waste treatment plant. Although the private partners do not provide equity capital, they assume some operating risks and act as a buffer between operational decision-making and local government.

- Turnkey projects - the private partner designs, constructs, and operates an environmental facility that is owned by the public sector. Some of design and construction risk is shifted to the private partner, construction may be more rapid when undertaken outside the conventional governmental in-house channels, and the facility is somewhat distanced from government budgetary and political pressures.

- Developer financing - private developers or other private partners finance all or part of the construction or expansion of an environmental facility in return for the right to build residential, commercial, or industrial developments.

- Privatization - private sector partially or totally finances the facility and owns, builds, and operates it. A substantial amount of risk and cost is shifted to the private sector, and operational and financial decisions are independent of government pressures.

- Merchant facility - private sector makes a business decision to provide an environmental service to a community with the expectation that they will realize a profit. The local government provides no capital and assumes no risks.

Although they may provide benefits in the form of lower operating and construction costs, contract services and turnkey projects are not usually considered as innovative financing. It is the latter three types of partnerships that comprise the public-private partnership component of innovative financing.

Developer financing is generally passive participation. In passive private participation, private partners are silent partners; they are not actively involved in decision-making or investment allocation. Typically, private developers or new entrants contribute funds in exchange for contractually defined rights to use the

public works being constructed. The advantages of these arrangements, such as sale of sewer and water access rights, is the contribution to capital by those needing the incremental capacity and a corresponding shift in burden away from users already in the system. As with many other financial instruments, disadvantages include the possibility of altering development decisions.

Purchase of access rights is very similar to payment of impact fees; both are a one-time payment in exchange for assurance of capacity to meet future needs. In contrast to impact fees, access rights can be traded -- they may be sold back to the issuing jurisdiction or, in some jurisdictions, they may be sold to third parties in direct transactions like any other equity stock. Moreover, often they can be purchased significantly in advance of needs to assure access or a lower cost. In Escondido, California, water and sewer access rights can be sold back only to the municipal government. However, as sale and repurchase prices were scheduled to go up by a specified amount each year, and limited capacity was put up for sale, developers and individual investors had an incentive to purchase capacity at the outset if they had any intentions of hooking up to the system in the future (Apogee Research, 1987, p.p. 123-129).

Privatization and merchant facilities involve the private sector as active participants. In addition to having equity in the project, they determine day-to-day operations and long term investment plans. Their position is the same as private investors in any business venture. In the United States, changes introduced with the 1986 Tax Reform Act may dampen private incentives for participation in public works investments through more stringent constraints on tax-exempt financing and depreciation allowances.

Public equity or equity-like involvement in private undertakings is less common. Characteristically, a public political unit (municipality, for example) is assigned a portion of the gross or net revenues from a private venture as payment for government property sold or public services rendered to the venture. Government thus becomes a partner in the private profit-making project in return for its aid in establishing the project.

One disadvantage of this approach is uncertainty concerning a revenue stream which cannot be controlled or altered by the local jurisdiction. The advantage to the public at large is in being relieved of some portion of the cost of infrastructure provided to economically viable private ventures. The private venture gains because repayment of the public depends on future profitability.

The dividing lines among the four structural and administrative approaches discussed above are not hard and fast; one category often shades into another. Indeed, components of each approach are found in other approaches and some instruments could be redefined and placed in another category. For example, fees paid by members of special assessment districts are a form of exaction and utilities can be seen as a more narrowly defined type of independent special assessment district. Except for TIF districts, all approaches rely on some form of beneficiary-based fees for payment. TIF district payments are loosely related to benefits since those properties appreciating the most pay the greatest share of incremental taxes. However, TIF beneficiaries pay no more than their non-TIF counterparts in taxes.

Revolving Funds

Revolving funds represent a flexible and powerful government policy tool for financing infrastructure. They include a wide variety of financing mechanisms from the very simple to the extremely complex. The common thread is a base of capital that is lent to a borrower for use in purchasing an asset and that, upon being repaid, "revolves," or is lent again for another use. The variety among revolving funds arises in their methods for capitalization, operating characteristics, and loan terms. For instance, they can be capitalized

by grants, legislative appropriations, bond proceeds, or users fees; and they may be leveraged or unleveraged.

Unleveraged funds are those whose capital is used directly for infrastructure loans and is available for relending as it is repaid. This unleveraged fund is capitalized solely from a single series of payments, those to the sinking fund. Fund capital is lent directly to the borrower, and lending authority is rebuilt as repayments are made. However, this steady stream of payments is a valuable financial resource that could form the collateral for a bond or other debt instrument. The lending authority of this fund would be much more powerful if this payment stream were capitalized.

A leveraged fund greatly increases available resources by using the loan repayment stream and/or the initial capital base as collateral for a bond issue. Bond proceeds can then be lent to borrowers. Although administratively more complicated than an unleveraged fund, leveraging permits the fund to finance annually several times the value of its original capitalizations, depending on the structure of the bond issue.

There are several advantages to operating revolving funds. They can be a self-sustaining source of long-term financing which can reduce long-term provincial lending requirements; they can impose discipline on municipal borrowing; and they can be targeted by attaching strings to the lending of money. The weaknesses of this type of financing are that it may require a large capitalization initially, and the default risk of the loans is shifted to the province.

There are no examples of revolving loan funds for water and sewer which exist in Ontario, however in the United States, almost all of the states have established federal-state revolving funds for wastewater treatment facilities.

In this section, we examine factors that must be considered in evaluating and selecting financing options. We first discuss financing objectives, and then present three important classes of criteria that must be considered in the evaluation of financing options.

Objectives

When a municipality evaluates or selects a financing or charging option, it has to determine how well the particular option satisfies the overall objectives of the municipality. The following are some of the most important objectives that a municipal government must define before embarking on the evaluation or selection process:

- **Rate of Growth of community.**

  The municipal government may decide to encourage strong growth, allow "natural" growth, or opt for "constrained" growth in the interest of other objectives.

- **Impact on real estate prices.**

  The municipal government may decide not to interfere with real estate prices in the community or may decide to exert some influence on them, primarily as an adjunct to the preceding objective.

- **Fiscal objectives.**

  The municipal government may have various views on apportioning its sources of funds between municipal taxes, "earmarked" user charges (for services), its own reserves, or borrowing (through the issuing of municipal bonds). The municipal government may decide to increase or decrease any of those sources of funds, within an overall municipal budget objective.

- **Cross-subsidization.**

  The municipal government may decide to intentionally cross-subsidize certain sectors of its constituency. It may decide that certain industries should cross-subsidize others, that residential consumers should cross-subsidize certain industries or vice versa.

- **Environmental and service standards.**

  The municipal government may decide that the municipality is falling behind other municipalities in maintaining environmental or service standards, and therefore, requires increased investment and spending in certain areas to "catch up". Alternately, the municipal government may also decide to be the leader in environmental and service standards and assign the recovery of the costs associated with the objective to specific sectors of its constituency.

Criteria

When analyzing the various financing and administrative arrangements for infrastructure, public officials must keep in mind the public policy implications associated with innovative financing in general and each instrument in particular. Four important classes of criteria for assessing financing and charging options are discussed in detail below:

- Economic efficiency -- maximizing efficiency and social benefit in the economy through pricing goods and services at a level that reflects total costs.
- Fairness or equity -- equality in treatment of different groups of landowners and/or residents, including: equity between new entrants and established landowners/residents or between residents in special financing districts and all others (called inter-group equity); equity within a given group such as new entrants (intra-group equity); and equity between current participants and future generations (intergenerational equity).
- Market sensitivity or elasticity -- sensitivity of development decisions to fund-raising approaches introduced to finance public works, primarily developer alteration in plans in response to additional charges levied for development in a particular area and for development of a particular type.
- Administrative considerations -- including use of average or marginal cost pricing and timing bondability of revenue flows, form of revenue, and planning and administrative simplicity.

Economic Efficiency

Some of the practical aspects of setting water and sewer prices were presented in Section V, along with a discussion of beneficiary-pay policies. The focus of this discussion is the general principles of economic efficiency.

Economic theory holds that individuals will allocate their spending such that their utility, or benefit, is maximized. Producers, in turn, adjust production to maximize financial returns according to the way in which people allocate their spending. In a fully competitive market, where individuals face prices which reflect full social costs - i.e. the cost of production plus related costs, such as reduction of natural resources, increased pollution, opportunity cost, etc. - economic efficiency is maximized.

The economic efficiency of current arrangements for the delivery and financing of water and sewer services have been suspect because these services are not provided competitively. The economic efficiency of the provision of these services depends on how costs are recovered, which is decided by public officials rather than the market. Thus, economic efficiency must be considered as a criterion in evaluating particular financing options and administrative arrangements.

Economic efficiency is maximized when prices equal the long-run marginal costs of producing goods and services. That is, price must equal the incremental cost, in the long-run, of providing an additional unit of a good or service. As discussed in Section V, the question of who pays the prices of water and sewer services -- users, direct or indirect beneficiaries, etc. -- is an important concern. However, the more basic matter of determining marginal costs may be difficult. Though operating and maintenance costs are

relatively easy to assess incrementally, because of their short time horizons, capital costs must be forecast over a greater period of time. For instance, the functional lifespan of a capital expenditure to construct a sewage treatment plant is likely to be greater than thirty years. An accurate determination of long-run marginal cost over such a large, indeterminate time span is difficult.

There may be further complications when the incremental cost of providing for new users is considered. New developments located in areas which are more difficult to service theoretically face higher long-run marginal costs than existing developments. Yet it is probably not practical to have distinct rates for each development. In practice, a combination of financing mechanisms, such as user rates plus development charges, may be the best option.

The economic efficiency of a particular financing approach is a function both of the inherent nature of the mechanism and the method of implementation. Even if water were universally metered and charged for by the ounce, this would not be economically efficient unless water rates reflected actual costs. Even so, estimating full social costs can be tricky. In the case of sewer services, what is the social cost of beaches having to be closed in the summer due to the presence of contaminated sewer effluent?

In summary, assessing the economic efficiency of a financing approach consists of asking the following questions:

1. Have the true costs, i.e. the long-run marginal cost, of providing water and sewer services been determined?

2. Are these costs being recovered through the financing methods being used?

3. Are charges and rates:

    - based on the costs of providing these services; and
    - related to the use and/or benefit derived?

This last question leads into that of the equity or fairness of particular arrangements as they affect different societal groups.

Fairness

Established residents often state that "growth should pay its own way." In other words, it is not fair to tax the current population to provide infrastructure necessary for new entrants. Rather, those who benefit from this new public capital should bear the added financial burden. Approaches perceived as fair are most likely to be feasible politically and to survive legal challenges.

Equity or fairness is an elusive goal. Most controversy focuses on "inter-group" equity and "intra-group" equity. Both of these are forms of horizontal equity or equity between participants at a single point in time. A third concept is intergenerational equity or fairness over time between residents and entrants active now and future generations of residents or developers not yet involved.

Inter-group equity concerns the degree of fairness achieved between established residents and new entrants or between landowners in special financing districts and those outside. A key factor in intergroup equity is whether or not the benefits of the new development to established residents will themselves

outweigh the associated infrastructure costs they might be asked to finance. Some argue that the net benefit is negative, that the incremental costs are greater than the benefits enjoyed, and therefore some degree of financial support is required from new entrants and developers. An answer to this question depends on a careful identification and evaluation of the costs and benefits. This process, in turn, is vital to the choice of financing approach and the levels at which fees are set.

Intra-group equity concerns the degree of fairness among different developers or new entrants themselves. The form of private-public financing can directly affect equity among new entrants. Perceptions of unfairness can increase public resistance to innovative financing and/or influence the forms of financing selected by public officials. Individually negotiated agreements in particular can create problems unless variations can be rationalized by differences in infrastructure costs or local benefits provided rather than differences in bargaining strength.

Intergenerational equity relates to the distribution of burden over time among equivalent users. Although the current generation of users may have caused a shortfall in infrastructure capacity, it is not clear that they should be held responsible for the full costs of expansion since future generations of users will also benefit from these investments. Thus, the selection of financing instruments and the proportion of investment costs recouped from the current generation are affected by considerations of intergenerational equity.

Equity or fairness does not necessarily mean equal burden per unit or per acre; equity in general requires that each infrastructure user pay either in proportion to the impact resulting from his demand or, alternately, in proportion to the benefits received. Equity, therefore, is open to interpretation.

Just as each kind of development creates different impacts, some private-public financing tools are considered more equitable than others. However, there is more than one definition of equity and some instruments satisfy one definition but not another. For example, special assessment districts involve a close geographical association between fees paid and infrastructure financed, thus providing an equitable allocation of burden within a specifically defined area.

On the other hand, impact fees are imposed at the same rate for all developers in the jurisdiction regardless of location or cost of infrastructure immediately adjacent to each development. Tax increment financing (TIF) districts ensure equality of assessment for both established residents and new entrants. Nonetheless, this approach may be considered inequitable by those who feel that new entrants should pay for at least a portion of the incremental infrastructure needed with fees in addition to regular property taxes.

Utility user fees are considered fair because they are based on actual consumption and the same rate is charged to both established residents and new entrants in the same utility service area and, usually, throughout the whole utility system. Utility capital fees can be set at the same rate for all new entrants or at different rates for each service area within the utility. In this, they are similar to general impact fees and special assessment district fees respectively and have the same intra-group equity characteristics.

In contrast, negotiated exactions focus on maximizing private contributions to public works with little attention paid to fairness. Similarly, negotiated profit-sharing arrangements are not necessarily equal for all participants. Certificates of participation may or may not satisfy fairness conditions depending on how debt service funds are raised.

When designing private-public financing of infrastructure, public officials first must define equity as they perceive it. Second, they must decide whether equity is a primary consideration and, if not, what other

considerations take precedence. That is to say, they must determine to what degree they are willing to trade off equity in order to achieve other goals.

Fairness is not likely to be the sole criterion in selecting among financial options. For example, public officials must consider the economic and financial impact on the community at large of each new development and its importance to the community. This, in turn, requires officials to evaluate the impact on development itself of the approaches chosen.

Market Sensitivity

Public finance always takes into consideration the effect of innovative approaches on potential new entrants: how are economic decisions likely to change in response to how and how much developers are required to pay? Of the financing instruments considered here, only tax increment financing is likely to be neutral with respect to developer response. All other options place some additional financial burden on new entrants -- fees, special assessments, purchase of access rights, or utility capital fees.

Unless developers are insensitive to the type and level of financing approach, public officials must balance the goal of increased private contributions to infrastructure financing with the need to attract new growth and development. There are three areas in which the level and type of innovative financing may affect the response of new entrants, thus having an impact on local community environment as well as its financial situation.

- *Market entry*. If the additional burden imposed by innovative financing is considered too great, developers may choose to relocate to another jurisdiction with lower "entry" fees. The decision to continue development or abandon the project altogether is a function of demand elasticity; the decision to remain in a given community or move the project to another community depends on elasticity of location or the strength of commitment or preference the developer has for a given locale.

- *Project size and mix of uses*. Even if project location is unaffected, fee structure and level may influence the final outcome. For example, payments based on acreage may encourage developers to increase land use density thus minimizing fees per unit. They may also redesign a development to favour commercial space over residential. The degree of developer sensitivity determines the influence that infrastructure financing policies will have in shaping the projects themselves.

- *Land and development prices*. Rather than reducing profits, developers will naturally try to reduce the burden of infrastructure cost-sharing either by passing the costs forward to final customers (home buyers, commercial renters, etc.) or backward to landowners from whom they buy property for the project. The ability to pass infrastructure costs forward depends on the strength of demand for the final product (residential housing, commercial space etc.). If demand is strong and fairly insensitive (inelastic) to price increases, the incremental costs can be passed forward to final users without much effect on demand. The ability to pass costs backward by paying less for land depends on the elasticity of land supply -- how much land is available at various prices. If landowners are anxious to sell or land is readily available in suitable blocks, then it will be easier for developers to pass infrastructure investment costs backward and force land prices down.

Local officials must balance their need to pay for incremental infrastructure with the effects such exactions may have on the nature, volume, and prices of development itself. But they must do this without precise knowledge of the elasticities involved.

The characteristics of various approaches as they relate to elasticity of market response are shown in Table VII-1 on the following page. Both the instruments chosen and the base-unit selected to assess fees may influence development size and characteristics. Since any addition to regularly assessed taxes can turn away new development, only TIF districts are unlikely to affect entry decisions. Once a developer has decided to accept additional "entry" costs, innovative financing approaches will probably not affect development size unless there is a threshold below which developments are not assessed.

Innovative financing, however, can affect development design. Although ad valorem fees are unlikely to influence design, fees based on physical attributes of the project may. For example, distinctions in assessment among developments of different types (commercial, industrial, residential) may affect the final project mix.

Furthermore, development density may be altered in response to additional fees levied for infrastructure. All development entails basic costs which depend on the land area involved but not on the number of units built -- the fixed costs of land acquisition and preparation, for example. Any increase in the number of units or square feet built on a given land area spreads these fixed costs over a greater volume and thus reduces the average cost per finished unit. Any fee based on land area or lot frontage is an added incentive to increase density to spread these additional costs. Even fees assessed per unit or per square foot of finished space can influence density if there is strong pressure to maintain a given average cost per unit. Increased per-unit costs due to fees can be mitigated by increasing the number of units or square feet built per acre, thus spreading fixed costs over a greater number of units.

The effects of innovative financing on developer decisions (entry, development type and design) depend not only on the instrument selected but also on the base-unit chosen for assessment, the differentiation in treatment by development type (commercial, residential, industrial), local zoning constraints, and market conditions.

Administrative Considerations

In selecting the appropriate financing approach and setting rates, public officials must consider the administrative factors associated with each instrument. Four factors are particularly relevant:

- Distribution of Costs: Before fees are set, decisions should be made on how to allocate infrastructure costs. In particular, should fees be based on average or marginal costs?

- Timing: The assessments and revenue flows associated with each instrument have different time profiles. Public officials must decide which best suit their situation with respect to: infrastructure expenditures (initial capital, ongoing operations and maintenance), exactions (one-time or ongoing, when assessed and collected), and stage of development (undeveloped land without any infrastructure, land with infrastructure ready for buildings, or built up area).

Table VII-1: Public Policy Considerations Factors Relating to Elasticity

Financial Approach	Basic Unit for Fee Assessment	Entrant Response May Be Influenced with Respect to:		
		Entry into Area	Development Size	Development Type
SPECIAL DISTRICTS				
AssessmentDistrict	Land area	YES	NO	YES
	Number and type of building units	YES	NO	Possibly
	Street frontage	YES	NO	YES
	Assessedvalue	YES	NO	NO
TIF District	Assessedvalue	YES	NO	NO
EXACTIONS				
Negotiated Exactions	N.A.	YES	YES	YES
Impact Fees	Land area	YES	*	YES
	Building units	YES	*	Possibly
	Street frontage	YES	*	YES
	Assessedvalue	YES	NO	NO
UTILITIES				
Capital Fees				
One Time Charges	Anticipated consumption or building units	YES	NO	NO
Recurring Charges	Consumption	Maybe	NO	NO
User Fees	Consumption	Maybe	NO	NO
EQUITY ARRANGEMENTS				
Private Equity				
Active Investment	YES			
Passive Investment		**	**	**
Certificates of Participation	**	YES	NO	NO
Access Rights	Anticipated consumption			
Public Equity		YES	NO	NO
Profit Sharing	Actual income			

* Only if there is a distinction in fees between large and small projects.

** Depends on how funds are collected to pay debt service.

- Bondability and Form of Revenue : The timing of the revenue stream may not match the timing of expenditures required for a particular infrastructure investment. Bonds are one way to translate future revenues into funds today.

- Planning and Administrative Simplicity: The burden placed on local government in the planning and managing of financing systems may be affected by the relative complexity of the options. These may be a trade-off between complexity and fairness.

Distribution of Costs. Some infrastructure costs are so closely tied to a particular development that it is easy to calculate the project's fair share for example, the costs of tying in to the main water distribution system or building a connecting road. And, on-site costs are clearly the burden of the particular development. In many cases, however, a project's fair share of off-site infrastructure is less easily specified, particulary when there is no easy way to tailor the capacity exactly to the immediate demand created.

As an established community reaches the capacity of its infrastructure, the addition of one small development project will force the system beyond its physical capacity, requiring an expansion of off-site facilities. In most cases, such expansion cannot be made in small increments but requires a basic minimum level of investment -- a whole new wastewater treatment plant or an extra highway lane. Public officials may choose however to sacrifice some economies of scale and expand capacity in smaller units, but investments are nonetheless lumpy.

The question then arises as to how new entrants are to be assessed their fair share of the costs of such expansion. Should new development pay the full cost of expansion, that is, the full marginal cost? Or should each user of the system -- old and new -- pay an equal portion of the costs of expansion, thus assessing new entrants only their proportion of the average cost of the whole system? If marginal cost pricing is used, should new development pay for the whole "lump" of investment, or only the share that is required now? The answers to these questions will depend largely on decisions concerning equity, as discussed above.

Timing. Time affects the choice of financing approach in several ways:

- Time frame for infrastructure support: id the financing for the initial capital or the long-term costs of operations and maintenance as well;

- Maturity and direction of development itself: is the area being developed raw land or partially or fully developed property, and what changes are expected in the future time period;

- Time frame of developer assessments and payments: will the assessments and payments be one-time or continuing; and

- Time frame of revenue received by the local jurisdiction: will it be regular and predictable?

There are two components of public works financing: initial capital and ongoing operations. Over the short term, raising capital for construction is the prime concern. Most private-public financing arrangements focus on this need, ignoring the annual funds needed for maintenance, though many

financing approaches are equally suitable for funding operations and maintenance. Assessment districts provide a good example. In most cases, they have been used to finance initial capital costs only.

The level of expenditure and, to some extent, the type of infrastructure required, depend on the maturity of development and on the expected time frame of development. Infrastructure needs are greatest when property is being developed for the first time, and the surrounding infrastructure is relatively undeveloped. Some financing arrangements may be more applicable at different levels of maturity than others. For example, the sale of access rights and the imposition of exactions are more appropriate when property is first developed.

Moreover, some financing instruments are more suitable when high growth rates are anticipated; others are suitable even when no growth is expected. For example, TIF districts can be used only when property values are expected to increase substantially, whether in undeveloped areas or developed areas being revitalized. On the other hand, special assessment districts and utilities can be established in non-growth as well as high-growth jurisdictions and at any development maturity level.

Factors relating to developer assessment and payment must also be considered. There are three dimensions to this issue: the predictability of the assessment or time lapse between development planning and assessment, the time frame of the assessment itself, and the time frame for payment by the developer.

The predictability of assessment depends on the instrument used to finance infrastructure. In a negotiated arrangement, each agreement is unique and no developer can predict with certainty in advance. On the other hand, fees which are applied universally throughout a jurisdiction, such as impact fees or the purchase of utility access rights, are known in advance of project planning.

Many financing arrangements involve a single one-time assessment. For example, a special district established to underwrite the cost of a specified road improvement, typically makes a one-time assessment in which the total cost is divided among landowners based on acreage or frontage. Similarly, most impact fees are assessed at a single point in time for each development. On the other hand, utility districts may levy annual assessments on each district landowner.

The choice of one-time or ongoing assessment usually depends on whether or not the focus is on initial capital only. In these cases, bonding provides the bridge between the time frame for expenditure and for assessment and collection.The payment period may match that of assessment or may be stretched out in time: it clearly can never be less than the assessment time frame. Thus, one-time assessments can be collected all at once, as is generally the case with impact fees. Alternatively, one-time assessments may be paid in instalments. Ongoing assessments may be paid as they are set or in instalments, for example, quarterly payment of annual property taxes in TIF districts.

The time frame over which local jurisdictions receive revenues helps determine how funds are used. Revenue received with some regularity and certainty offers the greatest flexibility. For example, predictable annual payments can be used to back bond issues, thus permitting a larger up-front investment. Alternatively, such payments can offer assured support for maintenance and operations. One-time payments, such as most exactions, reduce long-term uncertainty, but they also limit flexibility.

Bondability. Construction of major infrastructure projects requires a large initial investment which is often not available from public or private sources in time for construction. Bonds provide the means to transform future revenues into funding needed now. If bond funding is an important criteria, selection of the financing structure and payment basis should take this into consideration.

Traditionally in the United States, only recurring revenues could be pledged as security for debt service on bonds issued to fund infrastructure: for example, property tax revenues, user fees, and other revenues based on regularly collected taxes or fees. One-time charges such as hook-up fees or impact fees generally have not been considered a predictable and steady enough income source to support bonds. As impact fees and other one-time charges could not be capitalized in the debt market, municipalities had to rely on GO bonds with the concomitant administrative disadvantages.

In the case of Ontario, where revenue bonds are not currently allowed, and general obligation bonds must be used, all structures and forms of payment are equally "unbondable." However, facility revenues from one-time and/or recurring fees can be pledged as the de facto repayment source and can be segregated in special accounts to ensure sufficient funds for debt service and amortization independent of other municipality obligations.

Form of Revenue. In choosing among financial approaches, public officials also need to take into account the form of fee payment -- cash versus land or services. In some cases, it may be administratively preferable for developers to contribute land or construction directly. Further, it may be possible for private firms to provide the public works facility for less than if done through a public contract.

Under negotiated agreements, both for exactions and for equity participation, contributions may take the form of land for rights of way, parks, school sites, or construction of additional facilities as well as cash. Special district assessments could be offset by contributions of land or construction services if preferred by the local authorities. Even impact fees, conventionally paid in cash, could be paid in kind. The construction services provided by developers under Houston's Water and Sewer Trust Funds system are contributions in kind by the early developers who are then reimbursed in part from cash (impact fee) contributions made by later developers.

In cases where contributions in kind are substituted for cash payments, the local jurisdiction calculates their cost to provide the services or construction. The contributing developer then receives a credit toward his impact fee or other assessment equal to the calculated cost, regardless of what it actually cost the developer. In all cases, such services must meet relevant state and local standards and criteria to receive credit. The advantage to the local jurisdiction is in bureaucratic effort saved and, perhaps, in earlier completion. The advantage to the developer is in earlier completion and, perhaps, in lower final cost if they can provide the services cheaper than the local authorities.

Planning and Administrative Simplicity. The relative simplicity or complexity of designing a charging system that maximizes fairness may have a significant effect on the difficulty and the cost of the planning process. The ultimate observance of fairness might involve complex engineering estimates, which separate future costs from past costs, marginal cost from sunk costs, and costs related to growth from those related to improvement of service quality or maintenance of existing service standards. Trade-offs are often necessary between the detail with which fairness is exercised and the complexity or costs of achieving that objective.

In addition, different administrative arrangements may affect the burden placed on the municipal government to manage a particular service option. Some options, even though highly equitable, may require significant amount of measurement, bookkeeping, and activities related to billing, collections and complaints. The most appropriate system almost always represents a trade-off between administrative simplicity and the extent to which the consumers' activities and facilities are detailed for charging purposes.

Summary of Findings and Conclusions

Ontario has been remarkably endowed with fresh water, and this has been a significant factor in the Province's growth and economic success. Growth has, in turn, presented a challenge to the Province and its local jurisdictions in the need to protect valuable and essential water resources. This century has seen continued and growing efforts to ensure water quality and quantity through the provision of water and sewer services.

Ontario municipal expenditures on these services totalled almost $1.6 billion in 1987 (the most recent year for which accurate information is available). This figure includes both capital and operating expenditures, but does not include direct Provincial investment in water and sewer facilities, which accounted for approximately $25 to $30 million during the same period.

Meeting these expenditures in the most efficient, effective and equitable way has become a concern for all levels of government, as fiscal restrictions become more pronounced. In particular, much attention has been focused on innovative financing approaches, especially those that are designed on the principal of "beneficiary-pays". The underlying notions of this principle are that expenditures should not exceed resulting benefits, and that the beneficiaries of a public service should contribute to the defrayal of related costs in proportion to the benefit they receive.

In Ontario, a variety of financing methods are employed to cover the capital and operating costs of water and sewer services. Given the pressures of projected expenditure needs and tight fiscal circumstances, there has been concern that current methods of revenue generation may not be adequate. This study discusses the benefits and costs associated with water and sewer services, the beneficiary-pays principle, and important considerations in evaluating financing options, and examines the current state of water and sewer financing in Ontario, through development of a water and sewer finance database, and through six case studies of representative jurisdictions in the Province.

Below, we summarize some of the main points of the previous chapters and present conclusions that may be drawn from the database and the six case studies.

Innovative Finance and Beneficiary Pays

Water and sewer services may be financed through a variety of mechanisms, ranging from general tax or tax-like charges to user- or beneficiary-based charges. As noted in Section VII, innovative financing is predicated upon a shift away from reliance on general government revenues or subsidization and towards "responsible fiscal practices", which generally include full-cost pricing and recovery of costs through dedicated service fees.

While it is generally agreed that beneficiaries should pay in proportion to the benefit they receive, the question of who benefits from water and sewer services, and to what extent, is not so simple.

The immediate beneficiaries are obvious. They are the direct recipients of the services. The availability of water and sewage treatment services enables local residents to live in greater comfort than would otherwise be possible. These services also enable the local residents to benefit from the fact that other activities can take place in close proximity, e.g. the growth of towns, the location of industries, etc.

However, there are also indirect beneficiaries. The population of an entire region benefits from the provision of local water and sewer services in that communicable diseases are prevented and various forms of physical and aesthetic pollution are mitigated. By extension, the entire province, and indeed the country, benefits from the provision of these services. Similarly, one region of high growth may benefit from the installation of water and sewage services in another slow-growth area if the pressure of growth is relieved. These kinds of arguments apply within cities, regions and whole Provinces, and suggest that there may be roles for all levels of government in financing the provision of water and sewer services. The degree of involvement would be proportional to the benefits derived, with "benefits" being interpreted liberally to include contributions to the advancement of various policy objectives such as distribution of growth, the achievement of local or international pollution abatement objectives, prevention of disease, stimulation of employment growth, etc.

Municipal Financing in Ontario

As described in Section IV, municipalities in Ontario rely on five basic revenue sources for financing water and sewer services:

- water and sewer rates;
- property taxes;
- grants from other levels of government;
- lot levies or development charges; and
- long-term borrowing.

Various combinations of these revenue sources are applied by those municipalities that have water and sewer expenditures.

From the beneficiary-pays perspective, water and sewer rates, lot levies and development charges are "good" financing options, and property taxes and grants are less "good". Debt financing may also be supported by the beneficiary-pays principle. The capital works have a long life-span, and it is appropriate that the costs of the works be shared over time by users, through rates based on an amortization schedule (i.e. through rates based on a blend of capital repayments and interest charges).

Our research suggests that, while municipalities may be decreasing their use of debt financing, they are not relying heavily on general revenues to finance water and sewer services.

The database developed for this study, as well as the case studies and anecdotal evidence, suggest that, for capital investment, municipalities are relying less on debt financing and more on capital reserves raised through the transfer of revenues to designated capital funds. From Table 6 of the database, for Ontario, trends in the distribution of municipal operating expenditures indicate a decrease in long-term debt charges, and an increase in transfers to own funds.

The six case study municipalities have adopted what they refer to as a "pay-as-you-go" approach. By this they mean the financing of capital expenditures largely through the accumulation of revenue in capital reserve funds. Some municipal representatives defend this form of pay-as-you-go approach as preferable to debt-financing. In their view, this approach has current users paying for future benefits, and, in turn, benefitting from past payments made by others. Reserve funds avoid some of the difficulties and dangers of debt-financing, and encourage long-term planning. In fact, the case studies conducted for this study show that municipalities using this form of pay-as-you-go approach apply complex long-term capital budgeting to manage their water and sewer systems.

Of course, the equitability of this form of pay-as-you-go system depends upon the methods of revenue generation that are used to supply the reserve fund, in other words, who is paying into it. The MARS database does not provide information on the particular sources of revenues transferred to reserve funds. However, the case studies provide information that is revealing.

Hamilton-Wentworth -- 85% of capital expenditures come directly from users and beneficiaries. Approximately 35% of capital expenditures are covered from current operating revenues; 15% are covered from the Lot Levy Reserve; and 35% are covered from the Capital Reserve, which consists of previous accumulations from operating revenues. The remaining 15% are from two sources: 5% from grants and subsidies and 10% from "Other Revenues".

Metropolitan Toronto -- There is no transfer of money from general tax revenues to the capital or operating accounts for either water or sewer services. Metro is anticipating a major expansion of its debt over the next four years to pay for water and sewer construction, and significant increases in operating costs are also foreseen. Metro predicts that it will be able to meet all of these requirements out of current revenues. By 1994, user charges will be paying 100% of the water supply costs (capital and operating) and 87% of the sewer costs (capital and operating).

Peel -- No water or sewer expenditures (capital or borrowing) are financed out of property taxes. The Region bills users according to a policy of full cost pricing, defined as pricing to cover all costs less Provincial Grants. 95% of household and businesses are metered, and a portion of rates goes to capital expenditures. Other sources of revenue for capital expenditures are Provincial grants, development charges and the issuing of debt, which is considered undesirable.

Windsor -- All residences, commercial users and industries have water meters, and rates are set according to capital and operating expenditure needs, both current and forecasted. While sewer costs are currently covered from property taxes, a user charge system is again under consideration. In the past, such a system has been rejected because of high administrative costs, and a large estimated shift in burden to lower property value residential users and tax exempt users.

Arnprior -- All users of water are metered, and billed a basic service charge, a charge per unit consumed, and a sewer surcharge. However, part of the cost of providing sewer services is covered from property taxes. The Town has considered increasing the sewer surcharge to reflect the total cost of sewer services, but it has not been politically acceptable, because a single industrial user, which uses 55% of the water consumed in Arnprior, would shoulder most of the burden.

Muskoka -- Approximately 22% of capital financing for the fiscal year 1990 was derived from tax revenue. However, the District considers this reliance on non-usage-sensitive charges to be equitable and appropriate. The justification for this follows from the argument that there is a value derived from potential use, which is made possible by the existence of services that are "ready to use". Muskoka has a large proportion of seasonal residents who may use water and sewer services only part of the year, and in some years may not use these services at all. Non-usage-sensitive charges allow the District to access revenue with which to maintain a higher level of service than would be possible through user charges alone.

The cases noted above demonstrate that users and beneficiaries are shouldering a large portion of the costs of water and sewer services. Even in cases that appear inefficient because of the use of general tax revenue, such a situation arises, not because of a lack of knowledge or consideration of economic efficiency or equitability, but precisely because factors other than strict adherence to user-pay systems are weighed in devising an appropriate financing scheme.

The use of Provincial grants in providing these services may also be appropriate. Grants can be an important means by which indirect beneficiaries contribute to the costs of water and sewer services. Smaller jurisdictions such as Muskoka and Arnprior may not be able, on their own, to afford the large capital expenditures necessary to provide adequate water and sewer services, because they lack either sufficient population or sufficient density of development (or both). However, other communities, and arguably the rest of the Province and the whole country, benefit from a high level of water and sewer services in smaller jurisdictions and remote areas. Protection from disease, the prevention of physical and aesthetic pollution, the high degree of mobility that is afforded people, and the sustainability of communities outside of major urban centres benefit the population as a whole.

The exact extent to which distant people and communities benefit from capital expenditures on a particular water or sewer system is, understandably, difficult to calculate. However, the existence of such benefits on a societal level is undeniable. Since it is impossible to isolate all individual beneficiaries, it may be appropriate that society at large contribute to the costs of water and sewer services, which provide a societal benefit.

Conclusions

The conclusions of this study are as follows:

1) There are benefits beyond those that accrue to the direct users of water and sewer services, and therefor, it may be appropriate for all levels of government, including the federal government, to contribute to the costs of providing these services;

2) In the case studies examined, users and beneficiaries are currently paying a major share of the costs of water and sewer services, with only a limited reliance, in some cases, on general revenue sources;

3) It is not at all clear that there is a need for a dramatic shift to innovative financing methods for water and sewers, at least in the case study municipalities examined. While there is insufficient evidence to apply this conclusion across all of Ontario's municipalities, in the case study jurisdictions, the financing methods applied appear to suit each municipality, and in many cases are based on sophisticated, long-term capital budgeting approaches.

   Nonetheless, there is anecdotal evidence that suggests Ontario municipalities would benefit from assistance in determining what financing mechanisms are available and practicable, and in determining the most appropriate financing mechanisms for their particular circumstances; and

4) The statements of municipal representatives suggest that there is no general concern among the case study municipalities about their ability to meet future water and sewer expenditure needs. As above, we note that these conclusions may not be applicable to all Ontario Municipalities.

APPENDIX B

CASE STUDIES

In this appendix, we present the results of a set of six case studies carried out on selected Ontario municipalities. The municipalities were picked by officials of the Ministry of The Environment to represent a reasonable cross-section of the circumstances in the Province.

The purposes of the case studies were to:

- document the municipalities' current approaches to meeting their financial requirements for water and sewer services;
- identify anticipated shortfalls in the abilities of the municipalities to meet their current or anticipated levels of investment in these facilities;
- evaluate the current approaches against a set of criteria and to ascertain the extent to which there was interest in other forms of financing to meet the municipalities' obligations; and
- to the extent possible with such a small sample of municipalities, to draw conclusions about the ability of municipalities to meet their future requirements.

Each case study report is preceded by a brief overview, summarizing the pertinent facts of the municipality, its current approach to paying for water and sewage services and its views on the need for other approaches to financing these services.

The six municipalities selected for study were the following:

- Town of Arnprior;
- District Municipality of Muskoka;
- Regional Municipality of Hamilton-Wentworth;
- Municipality of Metropolitan Toronto;
- Regional Municipality of Peel; and
- City of Windsor.

In agreement with officials of the Ministry, the following criteria were used to carry out an assessment of the financing approaches of the municipalities:

- revenue generation potential (the higher the better);
- economic efficiency (i.e. in accordance with principles of economic efficiency);
- ability to transfer costs to those who benefit;
- user acceptability;
- effort to administer;
- effectiveness (in achieving related goals such as water conservation); and
- equity (between and among groups of current and future users).

Town of Arnprior Case Study

Summary

The Town of Arnprior owns and operates its sewage and water treatment plants, and also owns and maintains its distribution systems. All users of water are metered in Arnprior, and are billed a basic service charge according to the size of the meter they use plus a charge per cubic meter on water consumed. Water users pay a sewer surcharge on their water bill, which pays for chemicals used in phosphorous removal during sewage treatment. The remainder of the sewage treatment cost is billed to users as part of their property taxes.

Capital expenditures are funded by debentures and 47.5% grants from MOE. Arnprior has increased its water rates in an effort to borrow less, but has found that revenue increases are less than expected due to a corresponding decrease in water usage. This suggests that there exists a significant price-elasticity of demand for water.

There are no developer charges, but developers must pay for connecting infrastructure. Operating expenditures are covered by water rates, the sewer surcharge and mill rates.

The Town has considered increasing the sewer surcharge on water bills to reflect the total cost of providing sewer services, but because one industrial consumer uses 55% of all water used in Arnprior, this company would bear most of the increase in fees; this would not be acceptable to the Town Council.

Other potential financing approaches are not necessarily practical, because of the small size of the Town and the limited number of users. The current system is considered to work well and no significant changes are expected.

The Town

The Town of Arnprior is located in the southeast corner of Renfrew County. It has a current population of approximately 6000 people and an area of approximately 1,350 hectares. Arnprior is situated on Highway 17, on the shore of the Ottawa River, approximately 35 miles west from the City of Ottawa.

Due to Arnprior's relatively short commuting distance from the urban areas of the Regional Municipality of Ottawa, and relatively inexpensive housing, Arnprior has been experiencing significant residential growth.

Arnprior is an established industrial and commercial centre, with approximately 15 major national and international industries situated in the town and over 400 other commercial and industrial businesses.

Arnprior is governed by an elected town council which serves a four-year term.

In order to accommodate future growth, Arnprior is negotiating with at least four neighbouring areas regarding a possible boundary expansion of Arnprior. The four areas are expected to be annexed by the Town when water and/or sewer services are provided by the Town to the surrounding areas. No date for annexation has been set as yet.

Water and Sewage Infrastructure

Water supply for the Town is from the Madawaska River. The water receives physical and chemical treatment before distribution from the water treatment plant. The Town owns the water treatment plant as well as the entire water distribution system.

Sanitary sewage from the Town flows to the sewage treatment plant which provides primary treatment plus continuous phosphorus removal. The Town owns the sewage treatment plant and plans are currently underway to upgrade and expand the capacity of the plant at an estimated cost of $ 6.5 million.

Storm sewer systems exist in some of the newer developments in Arnprior and under recently reconstructed roads.

Organization and Administration

All users of water are metered in Arnprior and are charged a basic service charge based on the size of the meter they use, and a charge per cubic metre on water consumption. The water consumption rate is a three stage, declining block rate.

One industrial user in particular, a producer of nylon fibres for carpet manufacturing uses approximately 80% of all water used by industry, and 55% of all water used by the entire town.

Water users pay a sewer surcharge on their water bill, which pays for chemicals used in phosphorus removal in sewage treatment. The remainder of the cost of treating the sewage is billed to users as part of their property taxes.

Financing Water and Sewer Services

Capital Expenditures and Revenues

Capital expenditures in Arnprior are funded by debentures and 47.5% grants provided by the Ministry of the Environment. In an effort to borrow less on the market and save money in financing charges, Arnprior has increased its water rates over the past number of years.

One difficulty the Town has faced when increasing its water rates is that as rates increase, consumption falls, and revenue does not rise as estimated.

Arnprior does not levy developer charges, although developers are required to pay for all infrastructure which connects new development with the existing system.

Operating Expenditures and Revenues

Operating expenditures for water and sewer works are covered by the water charge, the sewer surcharge, and mill rates. Estimated expenditures on water and sewers are based on projection of population and past sales. Although a sewer use bylaw has been passed, industries are currently not charged extra strength sewer surcharges.

Future Expenditure Requirements

Recent capital needs include 6.5 million dollars for upgrading the sewage treatment plant, and 100,000 dollars for rehabilitating its aging water distribution system. Money for the expenditures will be provided in part by the Province in the form of grants and by debentures on the rest.

Usefulness of Optional Financing Approaches

The Town of Arnprior has considered increasing the sewer surcharge on the water bill to reflect the total cost of providing the sewer services. However, since one large water user is responsible for most of the industrial consumption and at least half of the total consumption of the town, a surcharge on the water bill would greatly increase the amount that the industrial user would have to pay.

This increase in fees to the one user would not be acceptable to the Town Council, and they have decided to continue charging for water and sewer as in the past.

Exactions in Arnprior have not been considered in the past and it is unlikely they will be considered in the future due to the lack of large residential development projects occurring in the Town.

Arnprior is too small to consider having special financing districts and they were not in agreement that having the Hydro Commission also run the water and sewage system would be an improvement.

The Town currently pays its employees approximately 20% less than they would have to pay employees of the Province to run their water and sewer treatment systems. Representatives of the Town did not believe that a private organization could operate the systems cheaper than at present.

Revolving funds were considered a good suggestion only if Arnprior could borrow the money from the fund at a rate which is less than the market rates.

Evaluation

The evaluation criteria which have been used to examine alternative financing mechanisms in other case studies are: revenue potential, economic efficiency, ability to transfer costs, user acceptability, administrative effort, effectiveness, equity, and legal mandate.

The status quo in Arnprior -- metering, a sewer surcharge, and paying through property taxes appears from an economic standpoint to be inefficient. That is, users of sewage treatment facilities do not pay in accordance to the cost of treating the amount of sewage they produce.

However, because Arnprior is a small town with a limited number of users, the effects of switching from one method of charging to another would be magnified. That is, it would be unacceptable to the largest industrial user to increase the rates for sewage dramatically, while other users might be paying less. Increased costs to the industry could cause it to move, or, build its own water tower thereby decreasing the total water revenue to the Town dramatically.

The current system seems to work well for Arnprior both administratively and in terms of user acceptability. The ability of the Town to transfer increased costs of the system is somewhat limited by the relatively small number of users of the system.

REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
CASE STUDY

Summary

The Regional Municipality of Hamilton Wentworth owns and operates three sewage treatment plants and one water treatment facility. Approximately 50% of the Region's households have metered water supply and a program is in place that will have all households metered in 10 years. Current flat rates are calculated in proportion to the assessment of property. Water rates currently decline with increased volume, but the Region intends to have a uniform rate in place in two years.

Hamilton Wentworth has a reserve fund for capital expenditures on water and sewer facilities. A draw of funds is amortized over 10 years. The fund is self financing and does not require external borrowing. The Region also has a Lot Levy Reserve and charges industrial and commercial developments a development levy with an extra surcharge for density.

The Region's current financing arrangements are considered to be preferable to other available options.

Overview of the Region

The Region of Hamilton-Wentworth includes six local municipalities: Hamilton, Stoney Creek, Dundas, Amcaster, Flamborough and Glanbrook Township. In 1987 there were 163,600 households in the Region (population of 425,000). The Region is growing at a relatively slow pace: the number of households grew by approximately one percent per year during the last decade.

The Regional Municipality owns and operates all water and sanitary sewer facilities. It also owns and operates those storm sewers that are associated with regional roads and those that are combined with sanitary sewers and all storm sewers in Hamilton. All other storm sewers are the responsibilities of the municipalities.

Water and Sewer Infrastructure

Sewage Treatment

The Regional Municipality of Hamilton-Wentworth owns and operates three sewage treatment plants, the Dundas King Street plant, the Waterdown plant, and the Woodward Avenue plant. The following table describes the plants:

Plant	Type of Treatment	Population Served
Dundas King St.	• activated sludge • continuous phosphate removal	19,501
Waterdown	• activated sludge • continuous phosphate removal	3,900
Woodward Ave.	• activated sludge • continuous phosphate removal	300,000

Water Treatment

The main water treatment facility is located in the City of Hamilton and is owned and operated by the Regional Municipality. The facility supplies the Cities of Hamilton and Stoney Creek, and the Towns of Ancaster and Dundas. The town of Flamborough is supplied by three wells (Flamborough Hills, Greensville, and Waterdown) and the Burlington water supply system.

Billing

About one half of the Region's households have metered water supply. All new households have been metered since 1974. A metering program is in place, as a result of which all existing households will be metered within 10 years. Incentives are being offered to householders to put in meters more quickly. The Region bills the households with metered water supply directly, once every two months. The other households' water and sewer charges are based on a flat rate and appear on their tax bills.

Flat rates are imposed in proportion to the assessment of the property. A "benchmark" system is used for the calculation of the flat rate. In that system an "average" home is selected within the metered group. The annual water and sewer charges paid by that home are then compared with the assessment of the home. The ratio of the former to the latter becomes the benchmark and is applied to all unmetered households.

The Region's water rates currently decline with increasing volume. The rate for the "top cubic meter" is currently 20 percent lower than the basic rate. The Region recognizes the economic undesirability of that system and is increasing the rates for the top blocks to uniform rate within two years. For large industrial users the total water bill is estimated to increase on account of eliminating the discounts for large volume consumption by some 26 percent (apart from inflationary increases).

Organization and Administration

Hamilton-Wentworth has a well structured system for the recovery of capital costs. A reserve fund has been established for capital expenditures on water and sewer facilities, and is used for the following purposes:

- to meet current capital expenditures;
- to pay internal debts (within the municipality);
- to pay the small amounts of remaining external debt.

Each draw of funds for water and sewer capital expenditures is repaid over an amortization period of 10 years from current water and sewer revenues in equal instalments. The interest rate is set at the rate of inflation plus 3.5%. The fund is self-financing and does not require external borrowing.

The interest rates charged to water and sewer plant certainly do not match today's interest rate levels. However, the 10-year amortization period, which is a fraction of the plant's actual service life, compensates for that deficiency. For example, a payment relating to 8 percent interest and 10 years service life is approximately the same as a payment relating to 12.5 percent interest and 15 years service life. In fact, most plants lasts much longer. Hence, in the long run, payments for the water and sewer services into the Capital Reserve may be too high rather than too low, in spite of the low interest rate used.

Financing Water and Sewer Services

Current Accounts

In 1989, the Region spent $27.9 million on its sanitary sewer system, $5.6 million on storm sewers and $26.0 million on waterworks. The storm sewer expenditure includes on allocation of the costs of combined sewers, based on engineering estimates and expenditures on other storm sewers that are under regional Administration.

The amounts above include payments into the reserve fund which collects money from current revenues for covering capital expenditures. Also, as explained in the next section, a substantial portion of capital expenditures is financed directly from current operations (revenue).

Revenues from billings were $25.0 million for sanitary sewers and $21.0 million for water services. In addition, a variety of revenues is collected for special services, including industrial surcharges.

In Hamilton-Wentworth, the water and sanitary sewer services are completely self-financing (see next sub-section). Storm sewers are financed from general taxes.

Capital Account

Capital expenditures by the Region in 1989 amounted to $10.4 million for sanitary sewer systems, $10.1 million for storm sewers and $7.7 million for waterworks. Government of Ontario subsidies earmarked for sewer and water services amounted to less than $0.4 million. These subsidies are for subsidizing certain projects up to 15 percent of their capital costs.

Over the next five years (1990 to 1994) forcasted capital expenditures on water facilities show a slightly declining trend: from $15.6 million in 1990 to $14.0 million in 1994. Approximately 5 percent of those amounts are covered from grants and subsidies and 10 percent from "Other Revenue". Approximately 35 percent of the capital expenditure is covered from current operations (revenues), 15 percent from the Lot Levy Reserve, leaving 35 percent to be financed from the Capital Reserve. (Note that operating expenses include amortization of funds borrowed from the Capital Reserve. There is no distinction between interest and repayment of capital, i.e., all of the combined (or "blended") payments are included in operating expenses).

Capital expenditures on sanitary sewer facilities also show a decline from 1990 to 1994. Being quite "lumpy", the most meaningful figure is the average expenditure of approximately $17 million per year during the next five years. About 6 percent of that amount is covered by grants and subsidies, and 22 percent is made up of "Other Revenue". About 44 percent of the capital expenditures is covered from operating surpluses and 5 percent from the Lot Levy Reserve. That leaves 23 percent of the capital expenditures to be financed from the Capital Reserve.

With funds being withdrawn from the Capital Reserve and payments made into the Reserve from operations, the question is whether the reserve is increasing or declining. The Region's financial statements indicate that the reserve has been steadily increasing from approximately $70 million in 1985 to almost $100 million in 1989. Conversely, the Region's outstanding long term debt has increased from approximately $94 million in 1985 to $118 million in 1989, but Utility debt has declined from $58 million to $40 million during the same period.

Lot levies are for roads, water supply, sanitary sewers and storm sewer under regional jurisdiction. The levies will increase from the present $2,000 to $7,000 per home. They are paid into a Lot Levy Reserve. Starting June 19, 1990, industrial and commercial developments will also be charged development levies (over $20,000 per acre), with an extra surcharge for density. (Note that the local municipalities also charge lot levies of approximately $2,000 per home).

It appears that approximately 50 percent of the lot levies are allocated to roads, about 30% to water supply and the remaining 20% to sewers. There are fluctuations among these proportions from year to year.

Developers normally pay for the servicing of a subdivision. They receive credits against the levies. The credits may some times be as high as the developers' actual disbursements.

Storm sewers under regional jurisdiction are financed from general taxes. Where sanitary and storm sewers are combined engineering estimates are applied to the separation of costs between the two types of sewers.

Future Expenditure Requirements

The finances of Hamilton-Wentworth are in a healthy state and do not give any cause for concern with respect to the availability of funds for necessary expansions. There is no concern regarding excessive growth in facility requirements and, in fact, there is more concern regarding potential under-utilization of the existing plant. There were views expressed in respect of the demand for services:

- The main forms of excessive water consumption were identified as sprinklers being left on for unduly long periods of time, and leaks that are not being fixed. Interestingly, swimming pools were not considered to be major contributors to excess water consumption. It is expected that the installation of meters on all properties will reduce water consumption.

- Even without the installation of meters, the average water consumption per household is declining, due to the significant reduction in the average number of persons per household. Demographics are the main reasons for that trend. Consequently, potential under-utilization of existing facilities may prevail temporarily until surpassed by industrial and population growth.

- In response to the suggestion that water consumption is non-elastic the view was expressed that price elasticity of demands certainly exists in the industrial sector. In that sector alternatives exist, such as drawing water directly from the Lake for various purposes. In the residential/commercial sectors elasticity is smaller and is confined to discretionary water usage (such as sprinklers). The impact of elasticity reduces the revenue in areas obtainable from rate increases.

- The Region is fully aware of the impacts of demand elasticity and demographic changes and is conducting its planning in consideration of those factors. It is for those reasons that expansion plans for water and sewer services over the next 10 years are quite limited.

- MISA is expected to cause additional costs in the form of monitoring expenses. There could also be come increased sewer treatment expenses which, however, would be offset by appropriate user charges.

Innovative Financing Techniques

The Region's use of its Capital Reserve Fund is an innovative financing technique, possibly suitable for most municipalities that want to smooth the impacts of "lumpy" capital expenditures on the rate-payers. In fact, the Region feels that it has found the most appropriate way of financing its water and sewer plants and considers its approach to be preferable to other available options.

THE MUNICIPALITY OF METROPOLITAN TORONTO CASE STUDY

Summary

The Municipality of Metropolitan Toronto owns and operates four sewage treatment plants and four water treatment plants. The six individual municipalities within Metro own and operate their distribution and collection systems. Metro charges the municipalities for water and for sewage services (the charge for which is related to the volume of water consumed). Each municipality then bills users and includes a mark-up to cover its capital and operating costs. Water is metered in all areas except the City of Toronto, which applies a flat rate based on the number of outlets in each household.

Significant revenues are derived from surcharges paid by "heavy" industrial polluters and charges paid by waste disposal companies that truck wastes to sewage treatment plants. Provincial subsidies are also significant, as are payments from York Region for the supply of water to York.

Capital expenditures are financed from the following major sources:

- the Water Pollution Control Measures Capital Reserve Fund (for sewer services);
- current water rate revenue (for water supply services);
- debentures;
- Provincial subsidies; and,
- contribution from the Region of York (for water supply).

There is no transfer of money from general tax revenues to the capital or operating accounts for either water or sewage services. Metro is anticipating a major expansion of its debt over the next 4 years to pay for water and sewer construction. Significant increases in operating costs are also foreseen. Metro predicts that it will be able to meet all of these requirements out of current revenues. By 1994, user charges will be paying 100% of the water supply costs (capital and operating) and 87% of the sewer costs (capital and operating).

Metro Toronto does not charge lot levies, but they are being considered. While public utilities are not considered to offer advantages over the current system, there is some interest in the idea of public/private partnerships.

Overview of Region

Metropolitan Toronto consists of six municipalities: the City of Toronto, North York, Etobicoke, Scarborough, East York and York. In 1977, there were 770,000 households in Metro Toronto. Their number grew relatively slowly during the next decade: by approximately one percent per year. Metro's population is approximately 2.1 million.

Metropolitan Toronto has a two-tier water supply and pollution control (sewer) system. Metro Toronto owns and operates all the water supply and sewage treatment plants in its area, as well as the main water and sewer trunks (including trunk storm sewers). The six individual municipalities within Metro own and operate their distribution and collection systems.

Water and Sewer Infrastructure

Sewage Treatment

Metropolitan Toronto owns and operates four sewage treatment plants, described in the table below. Please note that approximate figures are presented for the population served by the North Toronto and Main sewage treatment plants. This is due to the fact that only about 50% of the sewage drained to the North Toronto system is treated by the North Toronto plant, and the remainder is treated at the Main plant.

Metro Toronto Sewage Treatment Plants

Plant	Type of Treatment	Population Served
Main	• activated sludge • continuous phosphorous removal	1,200,000
Humber	• activated sludge • continuous phosphate removal	546,000
North Toronto	• activated sludge • continuous phosphate removal	60,000
Hyland Creek	• activated sludge • continuous phosphate removal	354,000

Water Treatment

Metropolitan Toronto has four water treatment plants, which are presented below with production capacity indicated in Millions of litres per Day (Ml/D). Note that a planned expansion of the R.L. Clark plant will approximately double its capacity as of 1994.

Metro Toronto Water Treatment Plants

Plant	Ml/D
R.L. Clark	659
Easterly	455
R.C. Harris	1000
Island	273

Billing

Each of Metropolitan Toronto's municipalities bills users for water and sewage services. Water rates are metered in all member municipalities but for a portion of the City of Toronto. In parts of Toronto, water rates are assessed based on a count of water outlets in the homes.

There are no block rates in Metro, either declining or increasing with volume.

Organization and Administration

Metro charges the six municipalities wholesale rates for the supply of water. Separate charges are made for the acceptance of sewage from the municipalities. Both charges are, however, tied directly to the consumption of water, as only water is metered and sewage is not.

In 1990, Metro charges the municipalities $143.30 per 1,000 cubic metres of water. It charges an additional $252.20 for disposing of the water in the form of sewage. Thus, the total charge to the municipalities for each 1,000 cubic metres of water consumed is $399.50.

The municipalities add their own markups to there wholesale prices, to cover their own costs incurred in the construction and operations of their own distribution and collection systems. The markups range from 44 percent in Scarborough to 76 percent in East York. The City of Toronto is below the middle of the range, at 51 percent, with all the other municipalities, except Scarborough, being close to the upper end.

Financing Water and Sewer Services

Current Account

According to budget projections, the following annual growth rates are projected for operating and capital expenditures in Metro Toronto from 1989 to 1994:

- operating expenses for the sewer system: 8.0%
- operating expenses for the water supply system: 7.1%

Considering the growth of the systems, the increases in expenditures indicated above are somewhat greater than general inflation. However, they cannot be regarded as extraordinary.

Municipalities do not charge depreciation to operating expenses. They do charge, however, a "proxy" for depreciation, which they call "Provision to Reserve" or "Transfer to Reserve". As opposed to the rigorously prescribed methods of calculating depreciation (being pre-determined percentages of the assets' original costs), the contributions to capital reserves are unstructured, determined from budget to budget.

For sewer services the Transfers to Reserve are specified to grow from $21 million in 1990 to $22.7 million in 1994.

According to Metro's budget, water supply services will not increase or decrease the Reserve Fund in the next 5 years. Contribution to capital expenditures from current operations will be $3 million in 1989. $6 million in 1990, growing to $11 million by 1994.

Combining the "proxies" for depreciation with debt servicing charges, total capital-related charges are expected to increase between 1989 and 1994 by 17.4 percent annually from water supply services and by 14.8 percent for sewer services.

There are significant revenues from direct sewage-related charges, such as surcharges paid by "heavy" industrial polluters and charges paid by waste disposal companies engaged in the trucking of wastes to sewage treatment plants. They amount to approximately 10 percent of total sewage-related revenues. There are also small direct revenues related to water supply, in the order of $2 million per year (in the order of 2-3 percent of total water supply revenues).

Provincial subsidies related to projects initiated prior to 1990 are significant, particularly in the sewage sector. In that sector they are in the order of $20 million annually throughout the five-year planning period. In the water supply sector, they are in the order of $8 million per year. There will be no provincial subsidies on new projects after 1990.

Metro Toronto has an agreement with York Region to supply water to York. Revenues for that water are projected to grow from approximately $17 million in 1990 to $27 million in 1994.

From 1990, there will be no cross-subsidization between water supply and sewer services. Each service will be a separate accounting entity, showing its own cost recovery.

Capital Account

Metro's capital expenditures on water and sewer systems are financed from the following major sources:

- draws from Water and Water Pollution Control Measures Capital Reserve Fund (for sewer services);
- contribution from current water rate revenue(for water supply services);
- issuing of debt (debentures);
- Provincial subsidies on projects initiated prior to 1990; and
- contribution from the Region of York (for the provisioning of water supply).

There is no transfer from general tax revenue to either operating or capital expenditures. Debt and funds drawn in prior years from the Reserve Fund are repaid from current revenues.

There are no lot levies charged by Metro, but the issue is being studied (Bill 20 deals with Lot Levies).

Even though there are no Metro lot levies, developers are constructing "bits and pieces" of water and sewer infrastructure in the development areas, in order to expedite development. It can be assumed that the costs of that infrastructure are included in the price charged by the developers.

The 1990-1994 budget for capital expenditure shows increases from the 1989 levels: increasing for sewer services by about 50% from 1989 to 1990 and almost doubling for water supply in that year. The increased annual capital expenditures are projected to stay at those levels throughout the budget period. The primary reason for this increase is previously deferred construction programs that can not be deferred any further. There are also expenditures associated with MISA.

The increased capital expenditures are planned to be financed by increases in debt. Metro plans to borrow $50 million to $60 million annually for sewer services and $14 million to $29 million annually for water supply. Those figures compare with borrowing of $1 million to $18 million for sewer services and practically no borrowing for water supply in the past ten years. However, borrowing in 1977 were similar to those predicted for 1990.

Future Expenditure Requirement

Despite the significant borrowing and increases in operating expenses in excess of inflation, in the next few years Metro Toronto will be able to service its debt from current revenues. These are the sources of funds for Metro's cash flow in 1990 and 1994:

For 1990:

	Water Supply	Sewer Services
Capital and Operating Expenditures:	100%	100%
Recovered from:		
• User Charges:	88.3%	72.2%
• Provincial Subsidies:	3.9%	11.4%
• Borrowing Less Debt Retirement Less Interest Payments:	7.8%	16.4%

In the Table above, revenues from York Region are counted as "User Charges". Operating and capital expenditures were combined in the Table.

For 1994:

	Water Supply	Sewer Services
Capital and Operating Expenditures:	100%	100%
Recovered from:		
• User Charges:	101.4%	86.5%
• Provincial Subsidies:	6.9%	9.1%
• Borrowing Less Debt Retirement Less Interest Payments:	-8.3%	4.4%

There is no transfer from general tax revenue.

Metro Toronto is entering a period of rising expenditures on water and sewer services. The main reason for the rise in capital-related expenses is the "pent-up" demand for plant improvement, reflecting many years of deferment. There are several reasons for the increases in operating expenses beyond the rate of inflation and system growth: they reflect deferred maintenance, increased operating expenses related to the new plant additions (paralleling increased capital expenditures) and expenses related to new government regulations.

MISA imposes some extra burden on Metro, in the form of the costs of monitoring requirements. However, most of the costs of MISA will be imposed on waste generators, whose effluents will be controlled by the new regulations.

Innovative Financing Techniques

Metro does not consider public utilities to present any advantages in financing water and sewer services, as they may put one public body against the other and do not appear to have easier ways of financing than the municipalities themselves.

Private/public partnership in the construction of certain facilities, on the other hand, may have a positive appeal to several Metro politicians and officials. Such a partnership would reduce Metro's debt, albeit at the expense of higher interest costs to the rate-payer (private costs of capital are generally higher than municipal financing costs). However, efficiencies of construction, operation and administration may offset the higher costs of capital. The views of this issue are not unanimous.

Views on lot levies are similarly divided. It appears, however, that lot levies are gaining increasing application in Ontario. They would reduce the direct burden on the rate payers, but the levies would likely be reflected in real estate prices. Metro is currently working on a development charge bylaw.

DISTRICT MUNICIPALITY OF MUSKOKA
CASE STUDY

Summary

The District of Muskoka owns six sewage treatment facilities, each serving relatively small populations, and seven water treatment plants. Water is generally metered everywhere except MacTier. There are some declining block rates, but these will likely be phased out.

Many properties are not served by water and/or sewer services. Wells and purified lake water are used for water and septic tanks for sewage.

Urban Service Levies, which exclude most cottages, which appear on the tax bill, are in addition to water and sewer use charges billed separately by the District.

Capital expenditures are funded through:

- grants from the province
- various reserve funds
- debentures
- development fees

The use of non-usage-sensitive charges to derive a significant part of water and sewer revenue is considered appropriate and equitable because this reflects the value of potential use at any given time in the future, even if use is minimal, as in the use of seasonal cottages.

Overview of the Region

The District Municipality of Muskoka includes the following communities: Bracebridge, Gravenhurst, Huntsville, MacTier, Bala, Port Carling, Hidden Valley and several other smaller communities. In 1987 it comprised 35,400 households, many of which are summer cottages, occupied only part of the year. The growth rate of the District is 1.2 percent per year.

The District, headquartered in Bracebridge, provides water and sewer services. The local communities provide such services as solid waste removal, street lighting and a range of services covered by general taxes. The tax bill to residents has three columns: Local taxes, District taxes and Education Taxes. The District taxes consist of three items: General Tax, Water Levy and Sewer Levy. The last two are listed under the heading "Urban Service Levies". In addition to the tax bill, all residents receive a water and sewer bill from the District.

Due to the low density of development, the users cannot support the water and sewer systems without provincial assistance. Provincial subsidies are therefore significant and cover more than one half of the capital expenditures. A provincial unconditional grant is being allocated to water and sewer services to cover a relatively small portion of operating expenses (less than 10%).

There is no distinction between permanent and seasonal residents in terms of taxes or user charges.

Water and Sewer Infrastructure

Sewage Treatment

The District Municipality of Muskoka owns six sewage treatment facilities. These facilities are operated by the District, or as is the case in Bracebridge and Huntsville, by the municipality where the facility is located. The six sewage treatment plants are described in the table below:

District of Muskoka Sewage Treatment Plants

Plant	Type of Treatment	Population Served
Bracebridge Lagoon	• conventional lagoon seasonal phosphorous removal - batch	n/a
Bracebridge	• extended aeration • continuous phosphorous removal	6,408
Gravenhurst	• conventional activated sludge • extended aeration • continuous phosphorous removal	4,782
Huntsville	• conventional activated sludge • continuous phosphorous removal	3,016

Bala	• communal septic tank • effluent filtration • continuous phosphorous removal	113
Port Carling	• extended aeration • effluent polishing • continuous phosphorous removal	700

Water Treatment

The District owns seven water treatment plants. They are operated by the District except for those in Huntsville and Bracebridge, which are run by the respective municipalities. The plants are located as follows:

District of Muskoka Water Treatment Plants

Location	# of facilities
Gravenhurst	1
Bracebridge	1
Georgian Bay	1
Huntsville	2
Muskoka Lakes	2

Billing

Water is generally metered everywhere except in MacTier. Metering is important in this District, as without metering people may leave the water flowing all winter to protect against freezing.

The District disapproves of declining block rates, as such rates discourage conservation. However, there are still a few declining block rates, to be phased out. As there is a fixed portion of the water bill in addition to the metered portion, some declining trend will still remain in the rate. (i.e. the more water is used, the lower the average cost per unit).

Organization and Administration

There are many properties not served by water and/or sewer services. Wells and purified lake water are used for water supply and septic tanks for waste disposal. A large majority of the wells are polluted to some extent, as regulations regarding the minimum distances of the septic tanks from the wells are often not observed. The drilling of wells is quite costly and paying for water services is more economical at most locations. When connecting to the water system the owner pays for the pipe on his own property and for connection to the existing system through "local improvement charges." Septic tanks are more competitive with municipal sewer services, primarily because people do not service the tanks in accordance with desirable standards. The use of communal septic tanks is not too popular. Only 11 households use them in the whole District.

Financing Water and Sewer Services

Current Account

The Urban Service Levies on the tax bill are restricted to "urban areas", as defined by Council. That definition excludes most cottages.

The Urban Service Levies are in addition to the water and sewer user charges which are billed separately by the District. The two types of charges are similar in magnitude. The rationale behind the Urban Service Levy is the contention that there is a benefit associated with living in an urban area. Since it is not possible to maintain the urban style of living without water and sewer services, urban residents should pay for them more than those who do not enjoy the benefit of urban agglomerations. As those benefits are not usage-related, the Urban Services Levies are not usage-related either.

There is some cross-flow from general taxes to water and sewer services. That cross flow is termed "Environmental Levy". It is non-usage-sensitive (1/4 mil) and is earmarked to eliminate public health hazards that would arise in the absence of proper sewage treatment facilities.

The total flow of funds is summarized after the discussion of capital accounts.

Capital Account

Capital expenditures, over and above the grants received from the Province, are covered from these sources:

- various reserve funds
- debentures earmarked for water and sewer services
- development fees

The reserve funds are kept solvent by the Urban Service Levies, the Environmental Levy and by the amounts paid into the funds by the water and sewer services (from current revenues), as they repay some of the amounts drawn in previous years for the financing of capital projects.

Development levies are charged to developers when lots are created. The levies cover roads, water and sewer services. Where there are no sewer services, a charge is still levied in expectation of future unrecovered costs that will be associated with the disposal of septic tank waste. In addition to paying development levies, the developers are required to install the pipes within their lots.

The table below presents the budgeted flows of revenues and actual capital financing for water and sewer services in 1990:

Budgeted Revenues and Actual Capital Financing (1990)

	Water		Sewer	
	'000$	%	'000$	%
User fee revenue	2,234	21.9	1,928	10.7
Tax revenue (inc. Urban Service Levies)	1,295	12.7	2,671	14.9
Provincial Grants	4,982	48.9	8.951	49.7
Net borrowing[1] .	(724)	(7.1)	3,476	19.3
Draws from reserve funds	2,410	23.6	978	5.4
Total inflow (equals expenditure)	**10,197**	**100.0**	**18,004**	**100.0**

As indicated provincial grants cover almost one half of total costs. Borrowing, earmarked for water and sewer services, provide approximately 10% of the combined water and sewer service expenditures. That is in line with Ontario Municipal Board guidelines which specify a maximum of 20%. The District of Muskoka limits those charges to 15% of all expenses. The District would like to reduce them to 5% in the future, relying more on internal reserves, replenished through internally generated cashflows.

The District's principles regarding Reserve Funds were expressed as follows: The District replenishes Funds as available and uses them as needed.

Future Expenditure Requirement

The extraordinary expenditures are foreseen and, in fact, the district plans to reduce borrowings to one half their present levels, replacing them with internally generated revenues.

Innovative Financing Techniques

The District of Muskoka finds it equitable and appropriate to derive a significant part of its water and sewer revenue requirement from non-usage-sensitive, (i.e., tax-like) charges. The justification for that approach is as follows.

The Environmental and Pollution Control Levies, embedded in general taxes, reflect the concept of benefits derived from the fact that facilities are "ready to use", even when they are not much used at certain times by certain individuals. For example, there is a value associated with the existence of a cottage, even in those years in which the owner may only visit it a few times. The value is in its availability whenever required. The value of the "potential" use, as opposed to actual use, is even more pronounced when considering a cottage held for the purpose of the owner's retirement. The owner benefits from the fact that throughout the years prior to his/her retirement the quality of the environment is being maintained at higher standards than those that would be affordable without his/her annual contribution.

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1 Debentures issued, less debentures redeemed, plus short-term bridge financing (year-to-year carry-forwards).

REGIONAL MUNICIPALITY OF PEEL
CASE STUDY

Summary

The water and sewage treatment plants, major trunk lines, pumping stations and reservoirs are owned by the Province. Local distribution is owned by the Peel Region, which bills users directly for water and sewers. The Region bills according to a policy of full cost pricing, defined as pricing to cover all costs less provincial grants. Average cost pricing is used, and a replacement program is also factored into the rates. 95 percent of households and businesses are metered, and the Region is experimenting with computerized, remote metering, which could allow billing according to marginal cost.

Sources of revenue for capital are: provincial grants, development charges (lot levies), current contributions (portion of water and sewer rates) and the issuing of debt. No water and sewer expenditures (capital or borrowing) are financed out of property taxes. Borrowing is considered undesirable on the grounds that it is costly to the Municipality and reflects poor management, since interest costs must eventually be covered by user rates. To the extent that some borrowing is required, zero coupon bonds and, perhaps currency swaps would be preferred methods.

There is little interest in involving the private sector in the provision of water and sewer services.

Overview of the Region

The Region of Peel is situated to the west of Metropolitan Toronto and the Region of York, to the east of Halton Region and Wellington County and to the south of the counties of Dufferin and Simcoe. Lake Ontario is to the south of Peel. The land area of Peel is approximately 312,000 acres and the population in 1988 was 643,500. Peel is one of the fastest growing regions in Ontario. This growth has resulted in significant residential and commercial development: in 1988, building permits issued were valued at more than $2.3 billion, housing starts were at 11,323 and property assessment grew at the rate of 9 percent over the previous year.

The Regional Municipality of Peel and its three constituent municipalities (the Town of Caledon, the City of Brampton and the City of Mississauga) were created in 1974 out of 10 local municipalities in the former County of Peel. The Region is responsible for arterial roads, water supply, sewage and solid waste disposal, many health and social services, housing, finance, planning, policing and support to conservation authorities, the Children's Aid Society and hospital capital projects. The three local municipalities are responsible for local concerns.

Water and Sewer Infrastructure

This section describes the water and sewer facilities in Peel, the organization and administration of these facilities, the financing of the water and sewer facilities and future expenditure requirements.

The Facilities

The Region of Peel has two sewage treatment plants which are owned and operated by the provincial government and which are part of the South-Peel system. These are the Clarkson plant which serves 155,000 people and the Lakeview plant which serves 465,000 people. In both plants, the type of treatment used is conventional activated sludge and continuous phosphorous removal.The Province also owns and operates two water treatment plants which are part of the South-Peel system and are located in Mississauga. The Lakeview water treatment plant serves approximately 413,000 people; the Lorne Park water treatment plant serves approximately 207,000 people. In addition, the Region owns and operates approximately 35 well systems in Caledon which supply water to certain settlement areas.

In general, the water and sewage treatment plants, the major trunk lines, the pumping stations and the reservoirs are owned by the Ministry of the Environment. The local distribution is owned by the Peel Region and the storm sewers are operated by each local municipality.

Billing

The regional municipality bills users (consumers) directly for water and sewer services. Over 95 percent of households and businesses in Peel Region are metered for water, using outside meter reading devices. Peel is experimenting with a pilot project using computerized metering whereby not only can water consumption be metered via telephone lines without staff visiting the home or business but also the time of use can be determined. Such a metering system, should it prove to be technically viable, might permit future charges to vary according to use during peak and off-peak periods.

Organization and Administration

Under the arrangements between the Region of Peel and the Ontario Ministry of the Environment (MOE), all expenditures incurred by MOE for its operations in Peel are charged to the Region. On the operating side, these expenditures include such items as salaries, fuel, chemicals, and insurance, for example. Capital expenditures include any investment in water and sewage treatment plants.

The Ministry of the Environment provides the Region with a 20-year capital forecast, based in part on a population forecast provided to it by the Region. If in one year, MOE runs over budget, the Region goes back to Council for additional funds from reserves which have been accumulated from prior year surpluses. According to the Treasurer and Commissioner of Finance of the Region of Peel (Robert Richards), the relationship of the water and sewage treatment is not unlike that of a municipal department.

The sewer and water infrastructure in Peel is well regarded by the public, business community, and Regional Council. Rates are set fairly to reflect all costs. With the exception of a 15 percent capital grant from MOE, there is no other subsidization of sewer and water rates. Peel Council is fully supportive of user pay for sewer and water to reflect the true costs of providing this service. The question of Regional ownership of the assets presently owned by MOE has been discussed in the past. The Region has not found it advantageous to take over the assets since to do so would mean involving itself in additional labour complications as well as additional administrative costs presently borne by the Province. In addition, outstanding debt on the system was of a term longer than acceptable to the Region.

The Region is presently reconsidering this analysis to determine whether full responsibility for all aspects of water supply in Peel should rest in Regional hands. The newly proposed sewer and water crown corporation will also have to be taken into account when Peel reconsiders the ownership issue.

Financing Water and Sewers

Operating Expenditures and Revenues

In 1988, total operating expenditures of the Region of Peel for water (including current contributions to capital and reserves) were $44.6 million and for sanitary sewers were $42.3 million.

According to the Treasurer and Commissioner of Finance, expenditures are totalled and, given the water and sewage flows, rates are charged accordingly to cover expenditures. In the event that expenditures are less than anticipated at the beginning of the year or revenues are greater, there is a surplus. This surplus goes into a reserve fund for utility rate stabilization. Approximately $10 to $15 million is kept in reserve to flatten out rate increases. In other words, if a large increase is required in a particular year, the money set aside in the reserve funds can be applied to the expenditures in that year to reduce rates from what they would have been. These reserves have also been used to purchase water and sewer assets.

Water and sewer rates are reduced somewhat by the provincial General Support Grant (GSG) which forms part of the provincial unconditional grants package. The GSG received by any given municipality is calculated as 6.15 percent of the "general dollar levy," comprising prior year values for utility billings, and special assessment revenues under local improvement projects. This grant is subtracted from water and sewer expenditures is subtracted from the total for water and sewer expenditures by the Region of Peel before estimating water and sewer rates. In other words, a portion of this unconditional grant is allocated to water and sewers.

In 1988, direct charges on users for water totalled $33.9 million and for sanitary sewers $35.3 million. Connection charges for water and sanitary sewers totalled $8.8 million.

As noted above, water is metered in Peel. The water rate charge is levied per thousands of gallons or per tens of cubic meters. The sewage charge for residential users is based on 85 percent of the water consumption and reaches its maximum at 30,000 gallons for a 90 day quarterly billing. In other words, there is no sewer charge on water consumption in excess of 30,000 gallons. The reason for the 85 percent and 30,000 gallon limits on residential consumption is to recognize that some residential uses such as lawn watering and swimming pools do not result in the water being returned to the sanitary sewer. The non-residential sewer charge is based on 100 percent of water consumption unless analysis shows significant "absorption" of water in the production process.

The water and sewer rates for residential, commercial and industrial users for 1990 in the Region of Peel are the following:

Water rates:

(i)	consumption measured in Imperial Gallons	$1.58 per 1000 gallons
(ii)	consumption measured in Cubic Metres	$3.4755 per $10m^3$
(iii)	flat rate (prior to meter installation)	$6.00 per month

Sanitary Sewer Rates:

(i)	on water measured in Imperial Gallons	$1.98 per 1000 gallons
(ii)	on water measured in Cubic Metres	$4.3554 per $10m^3$
(iii)	flat rate (non-metered, sewers connected)	$6.00 per month

Capital Expenditures and Revenues

In 1988, capital expenditures on water in the Region of Peel totalled $35.2 million of which less than one percent was for land and buildings, 94 percent was for engineering structures and under 5 percent was for machinery and equipment. With respect to sanitary sewers, total capital expenditures in 1988 were $11.3 million: almost 95 percent of these expenditures were for engineering structures and the remainder was for machinery and equipment.

The sources of revenue for capital are: a provincial grant, development charges (lot levies), current contributions to capital (that is, a portion of water and sewer rates that is set aside for capital projects) and the issuing of debt. No water and sewer expenditures (capital or operating) are financed out of property taxes. This arrangement reflects a policy to charge users directly for water and sewer use.

The Province provides a 15 percent subsidy on capital expenditures for MOE- owned works which means that the Region is only required to raise funds to cover 85 percent of the capital expenditures. There is no provincial grant for operating expenditures, and, in recent years, no provincial subsidy has been available to finance Region-owned works which are eligible for subsidy.

The system of capital financing involving MOE and the Region of Peel changed in 1977 with respect to the issuance of debt. Prior to 1977, the Province borrowed funds for capital purposes and the debt charges that resulted were paid by the Region. Also, if in the operating budget, expenditures exceeded revenues

in a given years, the difference was capitalized and financed over a 40-year period. This meant that the debt kept increasing.

Since 1977, the outstanding debt has been frozen. Any outstanding debt (prior to 1977) which is on the books of the provincial government relating to the assets in Peel is still charged to the regional government. However, the Region now receives a bill from MOE for capital expenditures (rather than the Province going ahead and borrowing the money and passing the debt charges on to the Region). The Region now has discretion to finance these capital expenditures itself and can do so by using cash reserves, lot levy funds or by debt financing. The Region of Peel undertakes its own borrowing for capital expenditures, which it feels it can do more cheaply than relying on the Province to borrow the funds and charge them. Given its good credit rating, the Region can do as well on interest rates and it can avoid any provincial administrative charges on debt financing.

The Region aims to minimize borrowing to make capital expenditures for water and sewers. Operating expenditures are raised from water and sewer rates and these rates also include an additional $10 to $15 million for capital expenditures to avoid increasing debt in the future. In terms of intergenerational equity, it was felt that, borrowing limits are such that once sufficient debt capacity has been earmarked for other Regional programs, a balance has to be struck between the amount paid by today's users and tomorrow's residents. Levying rates for capital purposes on existing residents, placing these funds in reserve and then using these reserves to pay for benefits to future generations, means that one generation is subsidizing another.

With respect to development charges, the Region of Peel reduces the levy it charges to developers to compensate for potential double charging of new homebuyers. Specifically, the levy is reduced by an estimate of MOE and regional debt charges. Without this reduction in levy, new homebuyers would pay for infrastructure requirements through the development charge and for existing requirements through the payment of water and sewer rates. They would also be paying for past infrastructure investments to the extent that water and sewer rates cover debt charges on previous borrowing. Thus, this rebate on the development charge ensures that new homebuyers are not charged for past investments as well as present and future investments.

Future Expenditure Requirements

The system in Peel is considered by the Treasurer and Commissioner of Finance to work very well. It is a user-pay system with a replacement program worked into the rates. Approximately 95 percent of households and business in the Region are metered and the rates have generally risen by no more than the amount of inflation on an annual basis. There appears to be little concern with future demands on the system: sewer and water replacement and even meter replacement projects have been accounted for in the budget. With regard to MISA-related expenditures, it is not clear what the magnitude will be but, if these expenditures are mandated by the Province, it was suggested by the Treasurer and Commissioner of Finance that the Region would simply raise the water and sewer rates to cover them.

Innovative Financing Techniques

According to Peel's Treasurer and Commissioner of Finance, the status quo in the Region of Peel is full cost pricing (defined as pricing to cover all costs less provincial grants) and it is believed that this is the way to continue in the future. Exactions (defined as payments charged to specific developments that cause or contribute to new services) were considered to be more appropriate for smaller towns where arrangements could be made on property-by-property basis. Average cost pricing was considered to be the most appropriate on administrative grounds. With ten pressure zones and two water and sewage

treatment plants, forty to fifty different water and sewer rates would be required to implement marginal cost pricing. Average cost pricing is much simpler administratively.

With respect to debt financing, zero coupon bonds (non-interest bearing bonds) were favoured. This type of financing would permit members of the public to buy municipal debentures and, in essence, have a stake in their water and sewer facilities. Also, with zero coupon bonds, administrative costs tend to be fairly low because there is only one payment required -- at the maturity date. Allowing currency swaps (not feasible under existing legislation) was also recommended whereby a municipality could issue a debenture in one currency and exchange it for another. On the other hand, revolving funds were not favoured.

It was not considered advantageous or desirable for the private sector to become involved in water and sewer facilities. On the contrary, it was felt that there would be potential problems with private sector provision of water and sewer services, in particular where it was uneconomic to service certain areas. In other words, some areas would simply not be serviced. According to the Treasurer and Commissioner of Finance, the contracting out of parts of the service, for example, meter reading, was more acceptable but it was anticipated that such a system would be costlier than having the municipality do it itself. No evidence was provided to substantiate this claim.

In conclusion, in the Region of Peel, it was felt that there were no serious financing problems related to water and sewer investments. Rather, it was felt that some municipalities (not Peel) have planning problems and problems in their willingness to raise rates when required. The issue is not perceived to be the level of funding (provincial or local) but rather the proper management of available funds. This was interpreted to mean a system characterized by metering, full cost pricing and planning for future investments.

Evaluation

Evaluation criteria for examining alternative financing mechanisms and administrative arrangements have been outlined elsewhere. These are: revenue potential, economic efficiency, ability to transfer costs, user acceptability, administrative effort, effectiveness, equity and legal mandate.

The status quo in Peel -- metering, full cost pricing and planning for future investments in the user rate structure -- was considered to work well. In terms of the evaluation criteria, it was felt that metering leads to the efficient use of water and sewer facilities because users are paying for the benefits they receive from the services. Although it was recognized that marginal cost pricing would be even more efficient than the current use of average cost pricing, the latter was considered to be superior in terms of administrative effort.

Planning for future investment by charging today's users of water and sewer facilities was considered to be desirable by officials even though they believed that this type of financing leads to intergenerational inequities: today's users of the water and sewer systems are financing the use of future generations.

Municipal officials considered that borrowing was undesirable on the grounds that it is costly to the municipality and reflects poor management. Interest costs on borrowed funds will eventually have to be covered in the user rates. To the extent that some borrowing is required, however, it was felt that municipalities could and should be given the legal mandate to issue instruments such as zero coupon bonds and currency swaps.

In terms of public acceptability, it was felt in the Region of Peel that users and taxpayers find the current system acceptable. To avoid opposition resulting from large rate increases, the Region maintains a stabilization fund which allows it to dampen rate increases in years where costs go up significantly. Public acceptability is attributed in part to the lack of large rate increases in the last few years.

CITY OF WINDSOR
CASE STUDY

Summary

Sewage

The City of Windsor owns and operates its sewage treatment plants and distribution system. The City retails sewage services directly to users, billing through property taxes. The City also wholesales sewage services to several surrounding municipalities. Homes not connected to sewers are charged a fee to treat the sceptic. Windsor also has an extra-strength sewer surcharge for industrial users, and the City charges the landfill for treating leachate.

A sewer surcharge to be added to the water bills of users has been considered, but, in the past, not recommended for two reasons: the annual administrative cost that would be charged by the PUC would be large; and, there would be a shift in the burden of the sewer charges from commercial, industrial and business users to residential and property tax exempt users.

The City would consider some kind of public/private partnership in the operation of the sewage system. City officials suggested that revolving funds might be a good idea if municipalities could borrow money at the same rate as the Province.

Water

The Water Division of the Windsor Public Utilities Commission operates the retail distribution system. All residences, commercial users and industries have meters, and rates are set according to capital and operating expenditure needs, both current and forecasted. A single rate applies for all users, plus a fixed charge to each user based on the size of the meter. In addition, there is a summer levy, which is a higher rate applied to the amount of water used during summer months that is greater than that used during the winter. Rates are based on average cost.

The PUC plans to issue $90 to $100 million in twenty year debentures for a new capital construction and rehabilitation program, and considers the 15% grants from the MOE to be critical to its capital expenditures.

Overview of the City

Windsor is located in south-western Ontario, at the tip of the peninsula formed by Lake St. Clair, the Detroit River, and Lake Erie.

In 1988, Windsor had a population of more than 197,000 people. It has a land area of approximately 32,000 acres. Windsor is Canada's fifth largest industrial city.

Mutually beneficial trade agreements with the United States have enabled Windsor to lead as one of Canada's industrial cities. Ford, Chrysler, and General Motors are all represented with plants in the city and contribute substantially to the city's tax base. Many of the plants during the past two decades in Windsor have been a direct result of the need to supply the automotive industry in Canada and the United States with parts, tools and other related products and services.

The City of Windsor is governed under the Council-Chief Administrative Officer form of local government. The Mayor and Municipal Council are elected by the citizens of the community.

The City's Public Works department runs the sewage treatment and distribution system as well as the storm sewers.

Water and electricity are provided by the Windsor Utilities Commission, a Public Utilities Commission (PUC) whose board consists of four members and the Mayor, who, along with the City Council, are elected every three years.

Water and Sewer Infrastructure

Sewage Treatment

The City of Windsor has two sewage treatment plants, the Little River plant and the West Windsor plant. The Little River plant has conventional activated sludge treatment with continuous phosphorus removal. Its serves approximately 64,000 users. The West Windsor plant has physical-chemical treatment with continuous phosphorus removal, and serves approximately 123,000 users.

The City of Windsor owns and operates the two sewage treatment plants and the distribution system for the plants. The distribution system includes all infrastructure needed to get the sewage from the users of the system to the sewage treatment plant. As well, the City owns all of its storm sewers, and its combined storm and sanitary sewers.

Water Treatment

The water division of the PUC operates the water treatment plant and distribution system in Windsor. The PUC provides filtration and treatment to water taken from the Detroit River and distributes it to the City of Windsor and surrounding municipalities of Sandwich West, Sandwich South, St. Clair Beach, and Tecumseh.

The following provides details of the service the water division of the PUC provides:

	1988	1987
Population Served	224,521	224,317
# of Customers	56,955	56,574
Plant Capacity	60 M.G.D.	60 M.G.D.
Miles of Mains inside City	545	543
Prod'n (millions of imperial gallons)	14,302	14,331
Storage Cap. (millions of imperial gallons)	36.25	36.25

Source: The City of Windsor: Statistics and General Information, Fiscal Year Ended, December 31st, 1988.

Organization and Administration

Sewage

The City of Windsor retails the sewage services directly to its users, billing users a charge for the service as a component of property taxes. The City also wholesales some of its sewage services to its surrounding municipalities (part of Sandwich South and West, Tecumseh, and St. Clair Beach). Within the City of Windsor, all but an estimated three or four thousand homes are connected to sewers. For the other homes, the City charges a fee to treat the septic. The City also treats septic from homes which lie in surrounding municipalities for a charge based on recovering the costs of treatment.

Windsor has two other charges for treating waste, one for industrial users which is an extra-strength sewer surcharge (a charge for treating extra-strong industrial waste), while the other is a charge on the landfill for treating leachate.

Water

The water division of the Public Utilities Commission operates the retail distribution system in the City of Windsor and portions of the Townships of Sandwich South and West. Water is supplied to the Township of Sandwich West, Town of Tecumseh, and Village of St. Clair Beach on a wholesale basis for distribution through their own retail water system.

The City of Windsor is fully metered, with all residences, commercial users, and industries having meters.

Financing the Water and Sewer Services

Revenues, Sewers:

Monies for sewer services are collected by the City as part of property taxes. Some industries which discharges extra strength effluent into the sewage system pay "extra strength" sewer surcharges to the City. Windsor also relies on revenues from wholesaling water to outlying municipalities, and for treating leachate from the landfill site and septic from residential units which are not connected to sewage treatment infrastructure.

Expenditures, Sewers:

At the end of 1984, the City of Windsor had $105.5 million outstanding for all capital expenditures (or $548 per capita). The City decided in that year that a major fiscal restraint policy for capital spending should be undertaken to reduce the amount of the debt. Three steps were taken:

- maximum term for money to be borrowed for the City was limited to five years;
- long-term debt issued per year was not to exceed $7.5 million; and
- capital expenditures were kept to a minimum.

In 1986 the City was paying approximately $30 million in principal and interest payments on the debt outstanding. The City decided to concentrate on paying off their debt, and not decrease the amount of property taxes collected. As the debt gets paid off, more cash is left available for capital expenditures. The City terms this payment of cash for capital expenditures as "pay as you go" financing.

As of 1988, debt outstanding had been reduced to $76.2 million, or $395 per capita. The City of Windsor has invested on a regular basis in maintaining the current sewage system. Officials of the City did not foresee any difficulties in financing future projects for the sewage system except if the City is expected to pay the full cost of MISA related improvements (such as enforcement, monitoring etc).

Revenues, Water:

Revenues for water treatment are collected via a water bill sent to users by the Windsor PUC. Rates for the water are set according to capital and operating expenditure needs based on a ten year forecast prepared by the commission. The forecasted needs and the current needs are combined, and then divided among the number of users. There is a single rate for all users of the water, however there is a fixed charge to each user based on the size of the meter. Larger consumers of water would have larger meters and thus pay greater fixed charges for water than smaller residential customers. Data collected by the American Water Works Association[2] in a survey of municipal water rates in Ontario indicates that while the Windsor PUC charges the lowest water rate per meter cubed (14 cents), when compared to other jurisdictions which service over 35,000 accounts, the basic charge per month to users was the highest.

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2 American Water Works Association, Ontario Section Survey of Municipal Water Rates in Ontario, 1989.

When revenues were examined based on a typical monthly bill compared to other jurisdictions, Windsor had the lowest monthly billings after Etobicoke and Peel for residential users. Windsor also had the lowest "typical monthly bill" for the five other classes of water users (based on size of meter and amount of water consumed). It is interesting to note that for the two largest user categories (water use of over 10,000 m^3 per month), users paid approximately one half to one quarter of the water bill that users of the same size paid in other jurisdictions of the Province.

The PUC also levies a "summer levy" on all water users which charges heavy users of water in the summer months more for the water. The levy compares water consumption in the winter months to water consumption in the summer months. Any consumption of water in the summer which is over and above the consumption in the winter is charged for at a higher rate. The idea behind the levy is to encourage users to conserve their use of water in the summer months.

The PUC considers the 15% grants from the Ministry of the Environment critical in their capital expenditure program. In the next few years, the water rates for the City are expected to double because of the new capital expansion program.

Expenditures, Water:

Currently, the PUC has no debt outstanding for its water infrastructure. In the near future however, the PUC plans to issue $90 to $100 million in 20 year debentures. The money will be spent on new capital construction and rehabilitation program. The money is mixed between growth and rehabilitation expenditures and cannot easily be attributed to one or the other. That is, often a pipe may need replacing and it is replaced with pipe of larger diameter to facilitate more flow. Thus although the expenditures were made for rehabilitation, the bigger pipe was necessary for growth.

Consideration of a User-Pay Charge System

The current system by which the City bills for sewage services is not based on the user pay system. That is, both users and non-users of the sewage treatment facilities are being charged for the use of the system (since all parties who pay property tax pay for sewers in their mill rate). As well, some users of the system which are exempt from paying property taxes do not pay for the services which they are using.

In mid-1987, the City undertook some research which examined the effects of adding a sewer surcharge to the water bill. The City estimated that approximately $5.5 million of its sanitary sewer costs could be transferred from the tax bill to the water bill. The City also examined what would happen if all of its fire protection costs (which were currently being collected by the PUC) were collected on the tax bill, as these are more related to realty assessment than water consumption.

Costs to the City billed by the PUC for collecting the sewer billings, were estimated to be $700,000 per year. This $700,000 included a transfer of some of the costs the PUC was currently incurring for hydro and water fee collection.

For City streets which did not have sanitary sewers, these properties would be exempt from the charge for sewage. When examining the shift of the burden of the sanitary sewer charges among users, the City found that the most significant change in billing occurred as a shift from commercial and industrial taxpayers to the residential and exempt taxpayers. The City noted in its report that while in most cases

the commercial, industrial, and business taxpayers could write-off their use of sewage and water as expenses, residential taxpayers could not.

When the City further examined the cost shift to residential users, it found that while lower market value assessments would experience a significant increase in their total water and sewer bills, users with high market value assessments would experience a decrease in their total bills. In fact, an estimated 95% of the additional costs for single family residences connected to the sewer system was going to be charged to those properties with market values at less then $60,000. This shift in tax burden was expected to occur because under the system where users were billed for sewage as part of their mill rate, users with a lower property value paid less for sewage than those with a higher property value. When estimates were made of how much users would pay if the sewage billing was linked to the water bill, it was found that those with higher property values would have decreased costs for sewage, while those with lower property values would have to pay more.

The City did not recommend the sewer surcharge based on two factors: the large annual administrative cost they would be charged by the Windsor Utilities Commission, and; the shift in the burden of the sewer charges from commercial, industrial, and business, to residential and property tax exempt users.

An additional problem which City officials pointed out with a sewer surcharge is that many industrial establishments withdraw water from the Detroit River and use it as cooling water. The water is then discharged into the sanitary sewage system. Charging for sewage based on water consumption in this case would not capture the cost of treating this cooling water because the intake from the lake would not be controlled by the PUC.

The matter of adding a sewer charge onto the water bill has once again been brought up for discussion by the City Council and has not been decided upon as yet.

Future Financing Requirements

The City of Windsor plans to meet its future expenditures on sewer services the same was it is meeting the present demands. There are no sinking funds for sewers.

As mentioned above, the PUC is currently embarking on a capital expansion plan and will issues debentures to fund the debt.

Usefulness of Optional Financing Approaches

The City of Windsor would consider full cost pricing for sewage treatment. It was suggested by City officials that one way to approach this issue would be to add a sewer surcharge onto the water bill. The City officials suggested that in order to do this, they would have to control the water distribution system to ensure that prices for sewage were not just arbitrarily set.

The PUC has a system of "average cost" pricing, where total costs of providing the service are split among all users of the system.

Exactions and asset exchanges as well as special financing districts and levies were not thought to be suitable because Windsor is not a growing City. That is, without new development - asset exchanges do not exist.

The City would consider some kind of public/private partnership. Sludge disposal in the City is presently privatized and a proposal to privately treat sludge was considered recently but turned down. The City would see a public/private partnership in a more favourable light than just private ownership.

City officials suggested that revolving funds might be a good idea if municipalities could borrow money at the same rate at which the Province borrows it.

Evaluation

The current system of not billing users directly for sewage treatment (ie including the costs as part of the mill rate) is not equitable in the sense that non users of the system who own property pay for service which they do not use, while some users of the system who are exempt from paying property taxes (churches, schools, etc) do not pay for sewage treatment. Although some property owners with for example, a vacant lot, do not use the sewage treatment system, they do receive some benefit, in the form of an increased property value arising from the fact that the service is there if they need it. Users such as churches and schools who use the system and do not pay for it benefit from free use of the system.

The administrative costs however of switching to charging for sewage on the basis of the amount of water used is currently seen by the City of Windsor as prohibitive. As well, City officials suggested that because of the shift in burden from properties with higher market values to lower market values, the change in billing for sewer services from mill rates to a charge on the water bill would be unacceptable.

APPENDIX C

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WATER AND SEWER FINANCING IN ONTARIO: ISSUES AND OPTIONS

APPENDIX A

Database:

Municipal Financing
of Water and Sewer Services in Ontario
and Six Case Study Municipalities

The appendix is divided into eight parts, in the following order:

Ontario
Town of Arnprior
Regional Municipality of Hamilton-Wentworth
Municipality of Metropolitan Toronto
District Municipality of Muskoka
Regional Municipality of Peel
City of Windsor
Summary of Case Study Municipalities

The tables in each section appear in the following order:

Table 1.	Municipal Capital Fund Expenditures on Water & Sewers, 1977-1987
Table 2.	Municipal Capital Fund Expenditures per Household on Water & Sewers, 1977-1987
Table 3.	Municipal Revenue Fund Expenditures on Water & Sewers, 1977-1987
Table 4.	Municipal Revenue Fund Expenditures per Household on Water & Sewers, 1977-1987
Table 5.	Object of Municipal Revenue Fund Expenditures
Table 6.	Distribution of Municipal Revenue Fund Expenditures
Table 7.	Sources of Capital Financing for Water & Sewers, 1977-1987
Table 8.	Distribution of Capital Financing for Water & Sewers, 1977-1987
Table 9.	Net Long Term Liabilities for Water & Sewers, 1980-1987
Table 10A.	Analysis of MOE Projects - Municipal Revenue Fund Expenditures
Table 10B.	Analysis of MOE Projects - Municipal Capital Fund Expenditures
Table 10C.	Number of Households, Municipalities Reporting Water and Sewer Expenditures (Ontario only)
Table 11.	Sources of Revenue Fund Revenues for Water & Sewers
Table 12.	Source of Revenue for Water and Sewer (Number of Municipalities Reporting Water and Sewer Revenues (Ontario only))

Notes on Database

1) All of the tables presented are derived from data in the Municipal Access and Retrieval System (MARS) Database.

2) Constant dollar figures have been derived using price deflators for total government expenditures (implicit gross national expenditure (GNE) price deflators, as applied in the Bank of Canada Review). The indexes used for the years 1977 to 1987 are listed below.

Year	Index
77	68.6
78	73.6
79	80.6
80	88.6
81	100.0
82	111.1
83	117.4
84	121.9
85	126.3
86	130.0
87	134.8

To derive a 1981 constant dollar equivalent for an expenditure in 1978 of 5,431 dollars , the following calculation would be used:

$$\$5{,}431 \times \frac{100}{73.6} = \$7{,}379$$

The 1981 constant dollar figure for 5,431 1986 dollars would be:

$$\$5{,}431 \times \frac{100}{130.0} = \$4{,}178$$

3) Annual Average Growth figures in Tables 1-4 were derived by determining the annual rate of growth which, compounded, would account for the difference between a number for 1977 and the corresponding number for 1987 (whether in dollars or number of households, etc.). The following formula was used:

$$\left[\left(\frac{\text{1987 Total}}{\text{1977 Total}}\right)^{(1/10)} - 1\right] = \text{Annual Average Growth}$$

As an example, from Table 1 for Ontario, municipal capital fund expenditures on water for 1977 and 1987, respectively, were approximately $115,202,000 and $202,741,000 in current year dollars. Applying the formula above, annual average growth was calculated as follows:

$$\left[\left(\frac{202{,}741{,}000}{115{,}202{,}000}\right)^{(1/10)} - 1\right] = 0.05815$$

Annual average growth rates may be converted to percentage annual growth by multiplying the rate by 100. For example:

0.05815 X 100 = 5.815%

4) Data presented in the all-Ontario tables are only for those municipalities reporting water and sewer revenue or expenditures.

ONTARIO

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Ontario, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	9,257	135,008	42,726	177,734	115,202
78	25,240	134,031	59,989	194,020	112,803
79	25,096	149,238	57,287	206,525	104,947
80	20,407	129,364	62,097	191,462	94,588
81	16,338	149,989	59,132	209,121	105,982
82	6,976	165,305	61,569	226,873	124,215
83	12,171	160,473	64,374	224,847	114,201
84	7,343	195,613	58,656	254,269	120,835
85	18,488	186,954	66,596	253,550	121,120
86	16,512	189,259	61,875	251,134	146,858
87	20,382	194,037	64,183	258,220	202,741
Annual Average Growth Rate	0.08213	0.03694	0.04153	0.03806	0.05815

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	13,494	196,804	62,283	259,088	167,932
78	34,293	182,107	81,507	263,615	153,265
79	31,136	185,159	71,076	256,234	130,207
80	23,032	146,009	70,087	216,097	106,758
81	16,338	149,989	59,132	209,121	105,982
82	6,279	148,789	55,417	204,206	111,804
83	10,367	136,689	54,833	191,522	97,275
84	6,024	160,470	48,118	208,588	99,126
85	14,638	148,023	52,728	200,752	95,899
86	12,702	145,584	47,596	193,180	112,968
87	15,120	143,945	47,613	191,558	150,402
Annual Average Growth Rate	0.01145	-0.03079	-0.02650	-0.02975	-0.01096

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Ontario, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,383,750	3.88	56.64	17.92	74.56	48.33
78	2,452,166	10.29	54.66	24.46	79.12	46.00
79	2,526,109	9.93	59.08	22.68	81.76	41.54
80	2,578,699	7.91	50.17	24.08	74.25	36.68
81	2,640,432	6.19	56.80	22.39	79.20	40.14
82	2,680,420	2.60	61.67	22.97	84.64	46.34
83	2,686,799	4.53	59.73	23.96	83.69	42.50
84	2,703,834	2.72	72.35	21.69	94.04	44.69
85	2,762,464	6.69	67.68	24.11	91.78	43.85
86	2,814,598	5.87	67.24	21.98	89.23	52.18
87	2,884,832	7.07	67.26	22.25	89.51	70.28
Annual Average Growth Rate	0.01926	0.06168	0.01734	0.02185	0.01844	0.03816

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,383,750	5.66	82.56	26.13	108.69	70.45
78	2,452,166	13.98	74.26	33.24	107.50	62.50
79	2,526,109	12.33	73.30	28.14	101.43	51.54
80	2,578,699	8.93	56.62	27.18	83.80	41.40
81	2,640,432	6.19	56.80	22.39	79.20	40.14
82	2,680,420	2.34	55.51	20.67	76.18	41.71
83	2,686,799	3.86	50.87	20.41	71.28	36.20
84	2,703,834	2.23	59.35	17.80	77.15	36.66
85	2,762,464	5.30	53.58	19.09	72.67	34.71
86	2,814,598	4.51	51.72	16.91	68.63	40.14
87	2,884,832	5.24	49.90	16.50	66.40	52.14
Annual Average Growth Rate	0.01926	-0.00767	-0.04911	-0.04490	-0.04808	-0.02966

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Ontario, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	10,945	185,378	41,493	226,871	216,773
78	13,334	205,848	45,265	251,113	236,525
79	15,416	233,416	45,399	278,814	254,756
80	17,661	262,037	46,630	308,667	280,680
81	21,625	298,099	50,467	348,565	323,164
82	23,769	331,881	55,607	387,488	359,929
83	23,851	370,903	63,032	433,935	392,839
84	26,191	398,688	63,319	462,006	416,462
85	25,464	440,695	65,561	506,255	470,030
86	30,456	460,308	67,019	527,327	523,861
87	31,471	504,319	60,268	564,588	545,763
Annual Average Growth Rate	0.11139	0.10526	0.03803	0.09546	0.09673

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	15,955	270,231	60,485	330,716	315,996
78	18,117	279,685	61,502	341,187	321,365
79	19,126	289,598	56,326	345,924	316,074
80	19,933	295,753	52,630	348,382	316,794
81	21,625	298,099	50,467	348,565	323,164
82	21,394	298,723	50,051	348,774	323,968
83	20,316	315,931	53,690	369,621	334,616
84	21,486	327,061	51,943	379,004	341,642
85	20,161	348,927	51,909	400,835	372,154
86	23,428	354,083	51,553	405,636	402,970
87	23,346	374,124	44,709	418,834	404,869
Annual Average Growth Rate	0.03880	0.03307	-0.02977	0.02390	0.02509

Table 4: Municipal Revenue Fund Expenditures per Household on Water & Sewers, Ontario, 1977-1987

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,383,750	4.59	77.77	17.41	95.17	90.94
78	2,452,166	5.44	83.95	18.46	102.40	96.46
79	2,526,109	6.10	92.40	17.97	110.37	100.85
80	2,578,699	6.85	101.62	18.08	119.70	108.85
81	2,640,432	8.19	112.90	19.11	132.01	122.39
82	2,680,420	8.87	123.82	20.75	144.56	134.28
83	2,686,799	8.88	138.05	23.46	161.51	146.21
84	2,703,834	9.69	147.45	23.42	170.87	154.03
85	2,762,464	9.22	159.53	23.73	183.26	170.15
86	2,814,598	10.82	163.54	23.81	187.35	186.12
87	2,884,832	10.91	174.82	20.89	195.71	189.18
Annual Average Growth Rate	0.01926	0.09039	0.08437	0.01842	0.07475	0.07600

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,383,750	6.69	113.36	25.37	138.74	132.56
78	2,452,166	7.39	114.06	25.08	139.14	131.05
79	2,526,109	7.57	114.64	22.30	136.94	125.12
80	2,578,699	7.73	114.69	20.41	135.10	122.85
81	2,640,432	8.19	112.90	19.11	132.01	122.39
82	2,680,420	7.98	111.45	18.67	130.12	120.86
83	2,686,799	7.56	117.59	19.98	137.57	124.54
84	2,703,834	7.95	120.96	19.21	140.17	126.35
85	2,762,464	7.30	126.31	18.79	145.10	134.72
86	2,814,598	8.32	125.80	18.32	144.12	143.17
87	2,884,832	8.09	129.69	15.50	145.18	140.34
Annual Average Growth Rate	0.01926	0.01917	0.01354	-0.04810	0.00455	0.00572

Table 5: Object of Municipal Revenue Fund Expenditures, Ontario, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	57,845	98,949	93,138	17,996	708	1,595
	78	60,257	102,760	95,345	19,352	713	1,258
	79	61,470	100,837	93,946	31,728	701	916
	80	61,778	97,692	97,293	34,290	752	892
	81	60,556	93,883	99,758	39,475	658	3,768
	82	63,610	90,847	102,021	37,865	565	3,815
	83	67,292	101,136	103,640	37,405	794	5,664
	84	67,608	99,940	108,474	42,870	585	7,584
	85	69,021	104,710	113,343	52,960	826	8,067
	86	70,843	101,542	122,164	50,059	932	8,543
	87	73,275	97,809	128,979	63,733	938	9,389
STORM SEWERS	77	6,155	38,976	4,215	9,977	0	1,162
	78	6,326	40,053	4,178	9,763	18	1,164
	79	5,176	35,773	4,249	9,963	8	1,156
	80	5,509	34,400	4,167	7,418	1	1,135
	81	5,448	31,146	4,528	8,621	2	721
	82	5,390	31,958	4,398	7,553	1	750
	83	6,479	34,483	3,772	8,309	4	643
	84	5,792	34,381	3,858	7,375	1	536
	85	5,552	34,125	4,352	7,243	1	636
	86	5,820	31,751	3,880	9,187	1	915
	87	5,354	25,671	3,513	9,387	53	731
WATER	77	89,209	75,603	112,939	34,188	201	3,857
	78	88,520	76,588	109,341	39,973	190	6,754
	79	88,415	71,799	113,389	38,430	156	3,886
	80	88,995	68,207	108,583	40,861	253	5,433
	81	87,519	65,177	118,285	45,929	207	6,047
	82	91,371	62,617	115,693	46,318	168	7,803
	83	94,404	64,829	113,195	53,229	378	8,582
	84	94,948	63,127	119,844	56,354	122	7,247
	85	93,401	65,031	125,735	79,751	202	8,034
	86	97,875	62,711	133,720	99,770	182	8,713
	87	98,283	58,554	141,708	96,451	193	9,680
POLLUTION CONTROL	77	5,183	3,810	6,344	513	23	83
	78	5,348	4,145	6,744	1,302	36	541
	79	5,423	4,539	7,128	1,549	11	477
	80	5,678	4,378	6,841	2,278	10	748
	81	5,733	4,868	8,248	2,896	0	(120)
	82	6,129	4,588	8,368	2,461	11	(163)
	83	6,165	4,799	8,531	1,442	0	(622)
	84	7,013	4,902	8,945	1,456	12	(843)
	85	6,933	4,340	8,197	1,498	26	(832)
	86	7,929	5,565	9,346	1,348	57	(815)
	87	7,607	4,922	10,054	1,642	29	(908)

Table 6: Distribution of Municipal Revenue Fund Expenditures, Ontario, 1977-1987

PERCENT

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	21.41	36.62	34.47	6.66	0.26	0.59
	78	21.54	36.74	34.09	6.92	0.25	0.45
	79	21.23	34.82	32.44	10.96	0.24	0.32
	80	21.11	33.38	33.24	11.72	0.26	0.30
	81	20.31	31.49	33.46	13.24	0.22	1.26
	82	21.29	30.41	34.15	12.68	0.19	1.28
	83	21.30	32.01	32.80	11.84	0.25	1.79
	84	20.67	30.56	33.17	13.11	0.18	2.32
	85	19.78	30.01	32.48	15.18	0.24	2.31
	86	20.01	28.68	34.50	14.14	0.26	2.41
	87	19.59	26.14	34.47	17.04	0.25	2.51
STORM SEWERS	77	10.18	64.44	6.97	16.49	0.00	1.92
	78	10.29	65.12	6.79	15.88	0.03	1.89
	79	9.19	63.51	7.54	17.69	0.01	2.05
	80	10.47	65.36	7.92	14.09	0.00	2.16
	81	10.80	61.72	8.97	17.08	0.00	1.43
	82	10.77	63.85	8.79	15.09	0.00	1.50
	83	12.07	64.23	7.03	15.48	0.01	1.20
	84	11.15	66.19	7.43	14.20	0.00	1.03
	85	10.70	65.74	8.38	13.95	0.00	1.22
	86	11.29	61.59	7.53	17.82	0.00	1.78
	87	11.98	57.42	7.86	21.00	0.12	1.63
WATER	77	28.23	23.93	35.74	10.82	0.06	1.22
	78	27.54	23.83	34.02	12.44	0.06	2.10
	79	27.97	22.72	35.87	12.16	0.05	1.23
	80	28.49	21.84	34.77	13.08	0.08	1.74
	81	27.08	20.17	36.60	14.21	0.06	1.87
	82	28.20	19.33	35.71	14.30	0.05	2.41
	83	28.21	19.37	33.83	15.91	0.11	2.56
	84	27.79	18.48	35.08	16.49	0.04	2.12
	85	25.10	17.47	33.79	21.43	0.05	2.16
	86	24.29	15.56	33.18	24.76	0.05	2.16
	87	24.28	14.46	35.00	23.82	0.05	2.39
POLLUTION CONTROL	77	32.48	23.88	39.76	3.21	0.15	0.52
	78	29.52	22.88	37.22	7.19	0.20	2.98
	79	28.35	23.73	37.27	8.10	0.06	2.49
	80	28.49	21.96	34.32	11.43	0.05	3.75
	81	26.51	22.51	38.14	13.39	0.00	(0.55)
	82	28.65	21.45	39.11	11.50	0.05	(0.76)
	83	30.35	23.62	41.99	7.10	0.00	(3.06)
	84	32.64	22.82	41.63	6.78	0.06	(3.92)
	85	34.39	21.53	40.66	7.43	0.13	(4.13)
	86	33.84	23.75	39.89	5.75	0.24	(3.48)
	87	32.58	21.08	43.07	7.03	0.12	(3.89)

Table 7: Sources of Capital Financing for Water and Sewers, Ontario, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	19,820	15,304	2,469	97,415	135,008
	78	19,500	16,195	2,232	96,104	134,031
	79	36,049	11,584	876	100,728	149,238
	80	32,471	11,576	2,035	83,283	129,364
	81	38,617	9,724	1,081	100,567	149,989
	82	46,654	9,051	3,235	106,365	165,305
	83	44,248	8,337	1,211	106,677	160,473
	84	62,654	8,766	2,500	121,693	195,613
	85	61,788	5,149	3,083	116,933	186,954
	86	43,327	2,969	3,133	139,831	189,259
	87	42,691	1,341	2,568	147,437	194,037
STORM SEWERS	77	8,699	671	416	32,941	42,726
	78	10,485	1,606	1,374	46,524	59,989
	79	15,662	508	1,512	39,606	57,287
	80	17,326	648	2,807	41,316	62,097
	81	17,462	2,632	2,723	36,315	59,132
	82	16,774	276	3,020	41,498	61,569
	83	18,131	323	3,107	42,813	64,374
	84	15,511	2,105	4,183	36,857	58,656
	85	16,448	1,838	3,633	44,677	66,596
	86	15,145	0	3,378	43,351	61,875
	87	15,417	0	3,216	45,550	64,183
WATER	77	12,526	5,082	1,201	96,393	115,202
	78	16,061	4,402	1,668	90,672	112,803
	79	19,746	3,881	2,068	79,252	104,947
	80	13,607	3,657	3,317	74,006	94,588
	81	25,270	3,986	2,293	74,433	105,982
	82	33,156	2,410	1,428	87,222	124,215
	83	28,685	3,600	2,207	79,708	114,201
	84	27,739	5,888	2,191	85,017	120,835
	85	28,665	3,782	1,876	86,798	121,120
	86	30,531	938	1,133	114,256	146,858
	87	38,310	209	3,073	161,150	202,741
POLLUTION CONTROL	77	5,550	1,127	210	2,369	9,257
	78	1,260	86	0	23,894	25,240
	79	2,152	1,706	0	21,238	25,096
	80	6,240	1,379	0	12,788	20,407
	81	6,507	2,883	29	6,918	16,338
	82	3,241	456	0	3,279	6,976
	83	3,150	148	0	8,874	12,171
	84	4,035	7	0	3,300	7,343
	85	11,062	0	0	7,426	18,488
	86	4,449	267	0	11,796	16,512
	87	4,402	0	0	15,980	20,382

Table 7: Sources of Capital Financing for Water and Sewers, Ontario, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	28,892	22,309	3,599	142,004	196,804
	78	26,494	22,004	3,033	130,577	182,107
	79	44,726	14,373	1,087	124,973	185,159
	80	36,648	13,065	2,297	93,999	146,009
	81	38,617	9,724	1,081	100,567	149,989
	82	41,993	8,146	2,912	95,738	148,789
	83	37,690	7,101	1,032	90,866	136,689
	84	51,398	7,191	2,051	99,830	160,470
	85	48,922	4,077	2,441	92,584	148,023
	86	33,328	2,284	2,410	107,562	145,584
	87	31,670	995	1,905	109,375	143,945
STORM SEWERS	77	12,681	978	607	48,018	62,283
	78	14,247	2,182	1,867	63,212	81,507
	79	19,431	630	1,876	49,138	71,076
	80	19,556	732	3,168	46,632	70,087
	81	17,462	2,632	2,723	36,315	59,132
	82	15,098	249	2,719	37,352	55,417
	83	15,443	275	2,647	36,467	54,833
	84	12,724	1,726	3,432	30,235	48,118
	85	13,023	1,455	2,877	35,374	52,728
	86	11,650	0	2,598	33,347	47,596
	87	11,437	0	2,386	33,791	47,613
WATER	77	18,260	7,408	1,750	140,515	167,932
	78	21,821	5,981	2,266	123,196	153,265
	79	24,499	4,815	2,566	98,327	130,207
	80	15,358	4,128	3,744	83,528	106,758
	81	25,270	3,986	2,293	74,433	105,982
	82	29,843	2,169	1,285	78,507	111,804
	83	24,434	3,067	1,880	67,895	97,275
	84	22,755	4,830	1,798	69,743	99,126
	85	22,696	2,994	1,485	68,724	95,899
	86	23,485	722	872	87,889	112,968
	87	28,420	155	2,279	119,548	150,402
POLLUTION CONTROL	77	8,091	1,643	306	3,454	13,494
	78	1,711	117	0	32,465	34,293
	79	2,670	2,116	0	26,350	31,136
	80	7,042	1,556	0	14,434	23,032
	81	6,507	2,883	29	6,918	16,338
	82	2,917	410	0	2,952	6,279
	83	2,683	126	0	7,558	10,367
	84	3,310	6	0	2,707	6,024
	85	8,759	0	0	5,879	14,638
	86	3,422	205	0	9,074	12,702
	87	3,265	0	0	11,855	15,120

Table 8: Distribution of Capital Financing for Water & Sewer, Ontario, 1977-1987

	FY	PERCENT ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	14.68	11.34	1.83	72.16
	78	14.55	12.08	1.67	71.70
	79	24.16	7.76	0.59	67.50
	80	25.10	8.95	1.57	64.38
	81	25.75	6.48	0.72	67.05
	82	28.22	5.48	1.96	64.34
	83	27.57	5.20	0.75	66.48
	84	32.03	4.48	1.28	62.21
	85	33.05	2.75	1.65	62.55
	86	22.89	1.57	1.66	73.88
	87	22.00	0.69	1.32	75.98
STORM SEWERS	77	20.36	1.57	0.97	77.10
	78	17.48	2.68	2.29	77.55
	79	27.34	0.89	2.64	69.14
	80	27.90	1.04	4.52	66.53
	81	29.53	4.45	4.61	61.41
	82	27.24	0.45	4.91	67.40
	83	28.16	0.50	4.83	66.51
	84	26.44	3.59	7.13	62.84
	85	24.70	2.76	5.46	67.09
	86	24.48	0.00	5.46	70.06
	87	24.02	0.00	5.01	70.97
WATER	77	10.87	4.41	1.04	83.67
	78	14.24	3.90	1.48	80.38
	79	18.82	3.70	1.97	75.52
	80	14.39	3.87	3.51	78.24
	81	23.84	3.76	2.16	70.23
	82	26.69	1.94	1.15	70.22
	83	25.12	3.15	1.93	69.80
	84	22.96	4.87	1.81	70.36
	85	23.67	3.12	1.55	71.66
	86	20.79	0.64	0.77	77.80
	87	18.90	0.10	1.52	79.49
POLLUTION CONTROL	77	59.96	12.17	2.27	25.60
	78	4.99	0.34	0.00	94.67
	79	8.58	6.80	0.00	84.63
	80	30.58	6.76	0.00	62.67
	81	39.83	17.65	0.18	42.35
	82	46.46	6.54	0.00	47.01
	83	25.88	1.21	0.00	72.91
	84	54.96	0.10	0.00	44.94
	85	59.84	0.00	0.00	40.16
	86	26.94	1.62	0.00	71.44
	87	21.60	0.00	0.00	78.40

Table 9: Net Long Term Liabilities for Water and Sewers, Ontario, 1980-1987

FY	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
	CURRENT YEAR THOUSAND DOLLARS			
80	634,591	155,276	411,023	39,043
81	619,674	158,378	399,942	43,087
82	663,026	163,611	412,665	44,238
83	651,269	166,237	401,608	37,520
84	654,103	155,150	383,122	30,236
85	629,369	136,424	358,178	31,855
86	602,678	123,663	337,268	31,825
87	585,324	109,702	315,811	43,051

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Ontario, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	9,124		1,140
	78	11,578		1,519
	79	13,647		1,401
	80	13,709		1,551
	81	15,730		4,057
	82	22,892		4,766
	83	25,964		4,852
	84	21,059	504	4,556
	85	21,080	595	5,006
	86	31,838	551	5,062
	87	36,084	642	5,950
SEWER	77	18,966		5,954
	78	22,059		4,353
	79	28,698		4,329
	80	29,476		5,135
	81	33,796		4,916
	82	41,314		5,795
	83	49,496		5,857
	84	42,997	1,584	7,243
	85	45,985	1,668	8,798
	86	62,982	1,672	9,012
	87	64,126	2,048	10,608
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	13,300		1,662
	78	15,731		2,064
	79	16,932		1,738
	80	15,473		1,750
	81	15,730		4,057
	82	20,605		4,290
	83	22,116		4,133
	84	17,276	413	3,738
	85	16,691	471	3,964
	86	24,491	424	3,894
	87	26,768	477	4,414
SEWER	77	27,647		8,679
	78	29,972		5,914
	79	35,605		5,371
	80	33,268		5,795
	81	33,796		4,916
	82	37,186		5,216
	83	42,160		4,989
	84	35,272	1,299	5,942
	85	36,409	1,321	6,966
	86	48,448	1,286	6,932
	87	47,571	1,519	7,870

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Ontario, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CURRENT YEAR THOUSAND DOLLARS		
WATER - Municipal Only			
80	(6,581)	107,191	146
81	(12,286)	83,304	8,877
82	(7,418)	93,668	9,036
83	(15,718)	98,846	9,609
84	(22,660)	117,671	11,838
85	(16,390)	98,362	12,160
86	(6,919)	85,478	8,826
87	(4,726)	82,153	8,571
WATER - Share of Integrated Projects			
80	(9,012)	45,498	2
81	(12,853)	56,098	4,928
82	(14,008)	56,660	4,986
83	(14,465)	52,137	4,603
84	(14,626)	53,169	4,723
85	(13,494)	53,235	4,978
86	(12,203)	51,025	4,740
87	(9,121)	47,566	4,460
SEWERS - Municipal Only			
80	(16,561)	170,919	161
81	(21,496)	197,283	19,045
82	(27,880)	198,743	19,296
83	(35,035)	197,967	18,935
84	(37,525)	199,003	19,531
85	(37,820)	201,905	20,799
86	(31,430)	201,914	20,342
87	(24,998)	187,681	19,940
SEWERS - Share of Integrated Projects			
80	(370)	3,077	0
81	(161)	2,365	216
82	(776)	2,498	217
83	(2,274)	9,068	825
84	(880)	3,451	333
85	(575)	6,106	567
86	28	5,972	704
87	(215)	3,820	404

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Ontario, 1980-1987

FY	CONSTANT 1981 THOUSAND DOLLARS ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	(7,428)	120,983	165
81	(12,286)	83,304	8,877
82	(6,677)	84,310	8,133
83	(13,389)	84,196	8,185
84	(18,589)	96,530	9,711
85	(12,977)	77,880	9,628
86	(5,323)	65,752	6,789
87	(3,506)	60,944	6,359
WATER - Share of Integrated Projects			
80	(10,172)	51,353	2
81	(12,853)	56,098	4,928
82	(12,608)	50,999	4,488
83	(12,321)	44,409	3,921
84	(11,998)	43,617	3,874
85	(10,684)	42,150	3,941
86	(9,387)	39,250	3,646
87	(6,766)	35,286	3,308
SEWERS - Municipal Only			
80	(18,691)	192,911	182
81	(21,496)	197,283	19,045
82	(25,095)	178,886	17,368
83	(29,843)	168,626	16,129
84	(30,783)	163,251	16,022
85	(29,945)	159,861	16,468
86	(24,177)	155,318	15,647
87	(18,545)	139,229	14,792
SEWERS - Share of Integrated Projects			
80	(418)	3,473	0
81	(161)	2,365	216
82	(698)	2,248	195
83	(1,937)	7,724	703
84	(722)	2,831	273
85	(455)	4,834	449
86	22	4,594	541
87	(160)	2,834	300

Table 10C: Number of Households, Municipalities Reporting Water and Sewer Expenditures, Ontario, 1977-1987

FY	TOTAL HOUSEHOLDS	TOTAL MUNIC	NUMBER			PERCENTAGE		
			LOW	MED	HIGH	LOW	MED	HIGH
1977	2,383,750	410	386	19	5	384	21	5
1978	2,452,166	420	395	20	5	393	22	5
1979	2,526,109	436	409	22	5	409	22	5
1980	2,578,699	441	414	22	5	413	23	5
1981	2,640,432	456	429	22	5	427	24	5
1982	2,680,420	461	434	22	5	432	23	6
1983	2,686,799	461	434	22	5	433	23	5
1984	2,703,834	465	437	23	5	437	23	5
1985	2,762,464	473	445	22	6	444	23	6
1986	2,814,598	483	455	23	5	453	24	6
1987	2,884,832	486	456	23	7	456	24	6

NOTES		NUMBER	PERCENTAGE
	LOW:	Less than 18,000	Less than 33.334%
	MED:	18,000 - 113,500	33.334% - 67.666%
	HIGH:	Greater than 113,500	Greater than 67.666%

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Ontario, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Ontario											
78	146,104	57,036	68,527	3,390	2,658	2,107	133	2,537	16,076	138,221	436,789
83	249,904	128,351	202,439	5,232	2,731	9,002	1,960	3,176	27,135	80,687	710,615
84	275,057	141,396	226,197	6,047	2,874	7,012	1,159	4,913	31,062	52,806	748,525
85	299,033	157,849	251,212	6,100	3,151	8,365	166	5,917	39,081	28,649	799,524
86	317,332	170,814	129,771	6,277	3,131	7,557	29	6,016	47,623	155,918	844,468
87	355,474	188,552	296,949	8,025	3,631	6,968	48	7,168	57,917	(42,963)	881,768

Table 12: Source of Revenue for Water and Sewer, Ontario, 1977-1987

	# OF MUNICIPALITIES REPORTING WATER AND SEWER REVENUES										
FY	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Direct Billings Only	174	186	189	189	181	182	189	188	188	184	187
Special Area Rates Only	7	4	4	5	5	7	4	4	4	3	3
Other Charges on Tax Bill Only	33	30	35	40	44	45	45	46	47	49	51
Direct Billings & Special Area Rates	23	23	29	34	34	28	26	29	30	30	28
Direct Billings & Other Charges on Tax Bills	128	129	127	128	137	146	142	148	148	157	156
Special Area Rates & Other Charges on Tax Bills	4	2	2	4	5	5	3	2	2	4	5
Direct Billings & Special Area Rates & Other Charges on Tax Bills	20	20	24	22	25	30	33	33	35	32	33
No Revenues for Water & Sewer	30	35	35	28	34	27	28	24	28	33	32
TOTAL MUNICIPALITIES	419	429	445	450	465	470	470	474	482	492	495

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Table 5: Object of Municipal Revenue Fund Expenditures, Ontario, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	39,682	67,879	63,893	12,345	486	1,094
	78	44,349	75,632	70,174	14,243	524	926
	79	49,545	81,274	75,720	25,573	565	738
	80	54,735	86,555	86,202	30,381	667	790
	81	60,556	93,883	99,758	39,475	658	3,768
	82	70,671	100,931	113,345	42,067	627	4,239
	83	79,001	118,733	121,674	43,914	932	6,649
	84	82,414	121,827	132,230	52,259	713	9,245
	85	87,173	132,249	143,152	66,888	1,043	10,189
	86	92,096	132,005	158,813	65,077	1,212	11,106
	87	98,775	131,847	173,864	85,912	1,265	12,657
STORM SEWERS	77	4,222	26,738	2,891	6,844	0	797
	78	4,656	29,479	3,075	7,186	13	857
	79	4,172	28,833	3,425	8,030	7	932
	80	4,881	30,478	3,692	6,572	1	1,006
	81	5,448	31,146	4,528	8,621	2	721
	82	5,989	35,506	4,886	8,391	1	834
	83	7,607	40,482	4,429	9,754	4	755
	84	7,061	41,911	4,703	8,990	1	654
	85	7,012	43,100	5,497	9,148	1	803
	86	7,566	41,276	5,044	11,943	1	1,190
	87	7,218	34,605	4,735	12,654	71	985
WATER	77	61,198	51,864	77,476	23,453	138	2,646
	78	65,151	56,368	80,475	29,420	140	4,971
	79	71,262	57,870	91,391	30,974	126	3,132
	80	78,849	60,432	96,204	36,203	224	4,814
	81	87,519	65,177	118,285	45,929	207	6,047
	82	101,513	69,567	128,534	51,459	186	8,669
	83	110,830	76,109	132,891	62,491	444	10,075
	84	115,742	76,952	146,090	68,695	149	8,834
	85	117,966	82,134	158,803	100,725	255	10,147
	86	127,237	81,524	173,836	129,701	236	11,327
	87	132,486	78,930	191,023	130,016	260	13,048
POLLUTION CONTROL	77	3,555	2,613	4,352	352	16	57
	78	3,936	3,051	4,964	959	27	398
	79	4,371	3,658	5,745	1,248	9	384
	80	5,031	3,879	6,061	2,018	9	663
	81	5,733	4,868	8,248	2,896	0	(120)
	82	6,809	5,098	9,297	2,734	13	(181)
	83	7,238	5,634	10,016	1,693	0	(730)
	84	8,549	5,976	10,904	1,775	15	(1,028)
	85	8,756	5,481	10,352	1,892	33	(1,051)
	86	10,307	7,234	12,149	1,752	74	(1,060)
	87	10,254	6,635	13,553	2,214	39	(1,224)

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Arnprior, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	5	0	0	0	1
78	1	0	0	0	16
79	11	3	3	5	17
80	8	8	24	32	0
81	14	0	46	46	1
82	0	0	2	2	37
83	0	0	2,171	2,171	3
84	0	0	245	245	4
85	0	15	0	15	3
86	0	205	0	205	310
87	20	264	0	264	0

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	7	0	0	0	2
78	2	0	0	0	21
79	14	3	3	7	21
80	9	9	28	36	0
81	14	0	46	46	1
82	0	0	1	1	33
83	0	0	1,849	1,849	3
84	0	0	201	201	3
85	0	12	0	12	2
86	0	157	0	157	239
87	15	196	0	196	0

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Arnprior, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,132	2.39	0.00	0.00	0.00	0.68
78	2,184	0.51	0.00	0.00	0.00	7.21
79	2,261	4.98	1.21	1.21	2.42	7.55
80	2,259	3.53	3.41	10.82	14.23	0.00
81	2,271	5.99	0.00	20.13	20.13	0.47
82	2,305	0.00	0.00	0.68	0.68	15.99
83	2,358	0.00	0.00	920.48	920.48	1.34
84	2,380	0.00	0.00	102.75	102.75	1.49
85	2,389	0.00	6.40	0.00	6.40	1.14
86	2,418	0.00	84.61	0.00	84.61	128.39
87	2,503	7.94	105.53	0.00	105.53	0.00

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,132	3.48	0.00	0.00	0.00	0.99
78	2,184	0.70	0.00	0.00	0.00	9.79
79	2,261	6.18	1.50	1.50	3.00	9.37
80	2,259	3.98	3.85	12.21	16.06	0.00
81	2,271	5.99	0.00	20.13	20.13	0.47
82	2,305	0.00	0.00	0.62	0.62	14.39
83	2,358	0.00	0.00	784.06	784.06	1.14
84	2,380	0.00	0.00	84.29	84.29	1.22
85	2,389	0.00	5.07	0.00	5.07	0.90
86	2,418	0.00	65.08	0.00	65.08	98.76
87	2,503	5.89	78.28	0.00	78.28	0.00

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Arnprior, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	128	53	3	56	211
78	129	45	1	46	229
79	139	37	2	40	254
80	148	45	4	49	246
81	177	39	4	43	268
82	150	39	2	41	323
83	176	48	4	52	338
84	166	46	7	53	328
85	203	118	2	120	393
86	177	112	5	117	473
87	205	140	5	145	398
Annual Average Growth Rate	0.04849	0.10223	0.04202	0.09949	0.06539

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	186	77	5	82	308
78	175	61	2	63	311
79	173	46	3	49	316
80	167	51	4	55	278
81	177	39	4	43	268
82	135	35	2	37	291
83	150	41	3	44	288
84	136	38	6	44	269
85	161	94	1	95	312
86	136	86	4	90	364
87	152	104	4	107	295
Annual Average Growth Rate	-0.01999	0.03024	-0.02605	0.02768	-0.00420

Table 4: **Municipal Revenue Fund Expenditures per Household on Water & Sewers, Arnprior, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,132	59.95	24.78	1.50	26.28	99.01
78	2,184	59.13	20.57	0.66	21.23	104.82
79	2,261	61.51	16.48	1.00	17.48	112.49
80	2,259	65.33	19.86	1.72	21.57	108.94
81	2,271	77.88	17.29	1.84	19.13	118.16
82	2,305	65.26	17.04	0.89	17.92	140.06
83	2,358	74.67	20.40	1.50	21.91	143.31
84	2,380	69.62	19.40	2.89	22.29	137.72
85	2,389	85.09	49.49	0.77	50.26	164.70
86	2,418	73.17	46.24	2.20	48.44	195.52
87	2,503	81.99	55.86	1.93	57.80	158.89
Annual Average Growth Rate	0.01617	0.03181	0.08469	0.02543	0.08200	0.04843

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	2,132	87.39	36.12	2.19	38.31	144.33
78	2,184	80.34	27.94	0.90	28.84	142.42
79	2,261	76.32	20.45	1.25	21.69	139.57
80	2,259	73.73	22.41	1.94	24.35	122.96
81	2,271	77.88	17.29	1.84	19.13	118.16
82	2,305	58.74	15.33	0.80	16.13	126.06
83	2,358	63.60	17.38	1.28	18.66	122.07
84	2,380	57.11	15.91	2.37	18.28	112.97
85	2,389	67.37	39.18	0.61	39.79	130.40
86	2,418	56.29	35.57	1.69	37.26	150.40
87	2,503	60.82	41.44	1.43	42.87	117.87
Annual Average Growth Rate	0.01617	-0.03559	0.01384	-0.04155	0.01132	-0.02005

Table 5: Object of Municipal Revenue Fund Expenditures, Arnprior, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	9	31	13	0	0	0
	78	8	31	2	0	0	4
	79	4	30	3	0	0	0
	80	1	30	3	10	0	1
	81	2	31	5	0	0	1
	82	3	30	6	0	0	0
	83	7	29	11	0	0	0
	84	4	31	11	0	0	0
	85	7	97	14	0	0	0
	86	5	93	14	0	0	0
	87	6	90	25	20	0	0
STORM SEWERS	77	1	0	2	0	0	0
	78	1	0	0	0	0	0
	79	2	0	1	0	0	0
	80	3	0	1	0	0	0
	81	3	0	1	0	0	0
	82	1	0	1	0	0	0
	83	2	0	2	0	0	0
	84	3	0	3	0	0	0
	85	1	0	1	0	0	0
	86	2	0	3	0	0	0
	87	2	0	3	0	0	0
WATER	77	56	67	89	5	0	(5)
	78	70	92	64	16	0	(12)
	79	69	92	90	17	0	(14)
	80	74	92	90	0	0	(10)
	81	88	92	97	1	0	(10)
	82	91	91	126	21	0	(7)
	83	95	90	148	3	0	2
	84	88	90	159	4	0	(13)
	85	92	90	229	0	0	(18)
	86	96	91	202	98	0	(14)
	87	85	90	186	50	0	(14)
POLLUTION CONTROL	77	33	56	35	2	0	2
	78	33	59	34	0	0	2
	79	35	65	36	0	0	2
	80	40	65	40	0	0	3
	81	46	65	50	14	0	3
	82	51	65	32	0	0	3
	83	57	65	51	0	0	3
	84	64	57	41	0	0	4
	85	51	57	85	7	0	3
	86	55	58	64	0	0	0
	87	58	57	66	20	0	4

Table 5: Object of Municipal Revenue Fund Expenditures, Arnprior, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	13	45	19	0	0	0
	78	11	42	3	0	0	5
	79	4	37	4	0	0	0
	80	1	34	4	11	0	1
	81	2	31	5	0	0	1
	82	3	27	6	0	0	0
	83	6	25	10	0	0	0
	84	4	26	9	0	0	0
	85	5	77	11	0	0	0
	86	4	71	11	0	0	0
	87	4	66	18	15	0	0
STORM SEWERS	77	2	0	3	0	0	0
	78	1	0	1	0	0	0
	79	2	0	1	0	0	0
	80	3	0	1	0	0	0
	81	3	0	1	0	0	0
	82	1	0	1	0	0	0
	83	2	0	1	0	0	0
	84	3	0	1	0	0	0
	85	0	0	3	0	0	0
	86	1	0	1	0	0	0
	87	1	0	3	0	0	0
WATER	77	82	97	129	7	0	(8)
	78	95	124	87	21	0	(17)
	79	86	114	112	21	0	(17)
	80	84	104	101	0	0	(12)
	81	88	92	97	1	0	(10)
	82	82	82	114	19	0	(6)
	83	81	77	126	3	0	1
	84	72	74	131	3	0	(10)
	85	73	71	181	0	0	(15)
	86	74	70	156	75	0	(11)
	87	63	67	138	37	0	(10)
POLLUTION CONTROL	77	48	81	50	3	0	3
	78	45	81	47	1	0	3
	79	44	81	45	0	0	3
	80	45	73	46	0	0	3
	81	46	65	50	14	0	3
	82	46	58	29	0	0	2
	83	49	56	43	0	0	3
	84	53	47	34	0	0	3
	85	41	45	67	5	0	3
	86	42	44	49	0	0	0
	87	43	43	49	15	0	3

Table 6: Distribution of Municipal Revenue Fund Expenditures, Arnprior, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	16.76	58.01	25.23	0.00	0.00	0.00
	78	17.49	68.60	5.48	0.00	0.00	8.43
	79	9.72	80.22	9.05	0.00	0.00	1.01
	80	2.12	67.05	6.93	21.96	0.00	1.94
	81	3.98	79.13	13.69	0.00	0.00	3.20
	82	8.02	76.13	15.84	0.00	0.00	0.00
	83	15.08	61.10	23.82	0.00	0.00	0.00
	84	9.71	67.43	22.85	0.00	0.00	0.00
	85	5.87	82.28	11.85	0.00	0.00	0.00
	86	4.76	82.88	12.36	0.00	0.00	0.00
	87	4.00	64.05	17.80	14.15	0.00	0.00
STORM SEWERS	77	33.91	0.00	66.09	0.00	0.00	0.00
	78	70.57	0.00	29.43	0.00	0.00	0.00
	79	71.41	0.00	28.59	0.00	0.00	0.00
	80	70.21	0.00	29.79	0.00	0.00	0.00
	81	68.28	0.00	31.72	0.00	0.00	0.00
	82	67.45	0.00	32.55	0.00	0.00	0.00
	83	50.96	0.00	49.04	0.00	0.00	0.00
	84	50.15	0.00	49.85	0.00	0.00	0.00
	85	29.16	0.00	70.84	0.00	0.00	0.00
	86	35.93	0.00	64.07	0.00	0.00	0.00
	87	40.79	0.00	59.21	0.00	0.00	0.00
WATER	77	26.70	31.67	41.97	2.20	0.00	(2.54)
	78	30.64	40.00	27.82	6.87	0.00	(5.34)
	79	27.12	36.06	35.44	6.71	0.00	(5.32)
	80	30.22	37.58	36.41	0.00	0.00	(4.22)
	81	32.80	34.26	36.11	0.40	0.00	(3.56)
	82	28.30	28.22	39.07	6.47	0.00	(2.05)
	83	28.01	26.77	43.80	0.94	0.00	0.49
	84	26.80	27.47	48.54	1.08	0.00	(3.89)
	85	23.50	22.93	58.26	0.00	0.00	(4.69)
	86	20.35	19.25	42.79	20.63	0.00	(3.02)
	87	21.47	22.69	46.77	12.57	0.00	(3.50)
POLLUTION CONTROL	77	25.84	43.62	27.04	1.76	0.00	1.75
	78	25.43	45.90	26.54	0.35	0.00	1.78
	79	25.30	46.99	26.12	0.00	0.00	1.60
	80	27.06	43.74	27.33	0.00	0.00	1.86
	81	25.97	36.54	28.21	7.70	0.00	1.58
	82	34.01	42.90	21.35	0.00	0.00	1.74
	83	32.39	37.04	28.77	0.00	0.00	1.80
	84	38.81	34.41	24.66	0.00	0.00	2.12
	85	25.23	28.04	41.72	3.35	0.00	1.66
	86	30.98	32.65	36.36	0.00	0.00	0.00
	87	28.21	27.93	32.40	9.69	0.00	1.77

Table 7: Sources of Capital Financing for Water and Sewers, Arnprior, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	3	3
	80	4	0	0	4	8
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	60	0	0	(44)	15
	86	216	0	0	(11)	205
	87	0	0	0	264	264
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	3	3
	80	24	0	0	1	24
	81	46	0	0	0	46
	82	0	0	0	2	2
	83	1,504	58	0	609	2,171
	84	243	0	0	2	245
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	0	0	0	1	1
	78	0	0	0	16	16
	79	0	0	0	17	17
	80	0	0	0	0	0
	81	0	0	0	1	1
	82	16	0	0	21	37
	83	0	0	0	3	3
	84	0	0	0	4	4
	85	0	0	0	3	3
	86	176	0	0	135	310
	87	0	0	0	0	0
POLLUTION CONTROL	77	0	5	0	0	5
	78	0	0	0	1	1
	79	11	0	0	0	11
	80	8	0	0	0	8
	81	0	0	0	14	14
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	20	20

Table 7: Sources of Capital Financing for Water and Sewers, Arnprior, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	3	3
	80	4	0	0	4	9
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	47	0	0	(35)	12
	86	166	0	0	(8)	157
	87	0	0	0	196	196
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	3	3
	80	27	0	0	1	28
	81	46	0	0	0	46
	82	0	0	0	1	1
	83	1,281	49	0	519	1,849
	84	199	0	0	1	201
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	0	0	0	2	2
	78	0	0	0	21	21
	79	0	0	0	21	21
	80	0	0	0	0	0
	81	0	0	0	1	1
	82	14	0	0	19	33
	83	0	0	0	3	3
	84	0	0	0	3	3
	85	0	0	0	2	2
	86	135	0	0	104	239
	87	0	0	0	0	0
POLLUTION CONTROL	77	0	7	0	0	7
	78	0	0	0	2	2
	79	14	0	0	0	14
	80	9	0	0	0	9
	81	0	0	0	14	14
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	15	15

Table 8: Distribution of Capital Financing for Water & Sewer, Arnprior, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	100.00
	80	50.00	0.00	0.00	50.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	390.13	0.00	0.00	(290.13)
	86	105.40	0.00	0.00	(5.40)
	87	0.00	0.00	0.00	100.00
STORM SEWERS	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	100.00
	80	97.85	0.00	0.00	2.15
	81	100.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	100.00
	83	69.28	2.67	0.00	28.06
	84	99.37	0.00	0.00	0.63
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00
WATER	77	0.00	0.00	0.00	100.00
	78	0.00	0.00	0.00	100.00
	79	0.00	0.00	0.00	100.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	100.00
	82	43.35	0.00	0.00	56.65
	83	0.00	0.00	0.00	100.00
	84	0.00	0.00	0.00	100.00
	85	0.00	0.00	0.00	100.00
	86	56.62	0.00	0.00	43.38
	87	0.00	0.00	0.00	0.00
POLLUTION CONTROL	77	0.00	96.58	0.00	3.42
	78	0.00	0.00	0.00	100.00
	79	100.00	0.00	0.00	0.00
	80	100.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	100.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	100.00

Table 9: Net Long Term Liabilities for Water and Sewers, Arnprior, 1980-1987

	CURRENT YEAR THOUSAND DOLLARS			
FY	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
80	199	0	584	382
81	184	0	541	346
82	170	0	494	307
83	155	0	444	264
84	487	0	390	226
85	448	0	331	186
86	409	0	266	142
87	369	0	196	94

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Arnprior, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Arnprior, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Arnprior, 1980-1987

	CONSTANT 1981 THOUSAND DOLLARS		
FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Arnprior, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Amprior											
78	193	37							6	23	260
83	344	68							23	(48)	386
84	356	79							25	(83)	377
85	369	82							26	37	514
86	389	90							29	(17)	492
87	437	119							29	(113)	473

REGIONAL MUNICIPALITY OF
HAMILTON-WENTWORTH

Table 1: **Municipal Capital Fund Expenditures on Water & Sewers, Hamilton-Wentworth, 1977-1987**

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	8,683	1,956	10,640	6,272
78	0	7,055	8,176	15,231	5,564
79	0	4,163	5,991	10,153	5,716
80	0	6,556	1,313	7,869	4,265
81	0	4,389	502	4,890	4,085
82	0	7,724	1,542	9,266	3,354
83	0	10,745	1,761	12,507	8,413
84	0	9,267	7,343	16,610	4,840
85	0	5,649	5,244	10,893	6,584
86	0	8,432	5,676	14,109	4,988
87	0	12,464	3,455	15,920	6,111

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	12,658	2,852	15,510	9,143
78	0	9,586	11,108	20,694	7,560
79	0	5,165	7,432	12,597	7,092
80	0	7,400	1,482	8,882	4,814
81	0	4,389	502	4,890	4,085
82	0	6,952	1,388	8,340	3,019
83	0	9,153	1,500	10,653	7,166
84	0	7,602	6,024	13,626	3,971
85	0	4,473	4,152	8,625	5,213
86	0	6,486	4,366	10,853	3,837
87	0	9,247	2,563	11,810	4,533

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Hamilton-Wentworth, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	146,739	0.00	59.18	13.33	72.51	42.74
78	151,206	0.00	46.66	54.07	100.73	36.80
79	152,763	0.00	27.25	39.21	66.46	37.42
80	153,347	0.00	42.75	8.56	51.32	27.82
81	154,090	0.00	28.48	3.26	31.74	26.51
82	154,914	0.00	49.86	9.96	59.81	21.65
83	155,519	0.00	69.09	11.33	80.42	54.09
84	157,141	0.00	58.97	46.73	105.70	30.80
85	159,034	0.00	35.52	32.97	68.50	41.40
86	160,974	0.00	52.38	35.26	87.64	30.98
87	163,607	0.00	76.18	21.12	97.30	37.35

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	146,739	0.00	86.26	19.43	105.69	62.31
78	151,206	0.00	63.39	73.46	136.86	50.00
79	152,763	0.00	33.81	48.65	82.46	46.43
80	153,347	0.00	48.25	9.66	57.92	31.39
81	154,090	0.00	28.48	3.26	31.74	26.51
82	154,914	0.00	44.88	8.96	53.84	19.49
83	155,519	0.00	58.85	9.65	68.50	46.08
84	157,141	0.00	48.38	38.34	86.71	25.27
85	159,034	0.00	28.12	26.11	54.23	32.78
86	160,974	0.00	40.30	27.12	67.42	23.83
87	163,607	0.00	56.52	15.67	72.18	27.71

Table 3: **Municipal Revenue Fund Expenditures on Water & Sewers, Hamilton-Wentworth, 1977-1987**

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	361	10,247	2,923	13,170	12,405
78	379	11,929	3,360	15,288	13,477
79	394	13,195	3,502	16,697	14,566
80	463	14,374	3,663	18,037	15,146
81	754	16,992	3,614	20,606	16,039
82	800	19,036	3,421	22,457	17,477
83	196	22,408	3,261	25,669	20,558
84	222	20,697	3,546	24,244	19,499
85	122	21,724	3,812	25,536	20,721
86	103	23,179	4,123	27,302	21,658
87	94	25,465	4,270	29,735	23,638
Annual Average Growth Rate	-0.12564	0.09530	0.03862	0.08484	0.06660

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	526	14,938	4,261	19,199	18,082
78	514	16,208	4,565	20,772	18,312
79	489	16,371	4,345	20,716	18,072
80	522	16,223	4,135	20,358	17,095
81	754	16,992	3,614	20,606	16,039
82	720	17,134	3,079	20,214	15,731
83	167	19,087	2,777	21,864	17,511
84	182	16,979	2,909	19,888	15,996
85	97	17,200	3,018	20,218	16,406
86	79	17,830	3,171	21,002	16,660
87	70	18,891	3,168	22,059	17,535
Annual Average Growth Rate	-0.18276	0.02376	-0.02922	0.01398	-0.00307

Table 4: **Municipal Revenue Fund Expenditures per Household on Water & Sewers, Hamilton-Wentworth, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	146,739	2.46	69.83	19.92	89.75	84.53
78	151,206	2.50	78.89	22.22	101.11	89.13
79	152,763	2.58	86.38	22.92	109.30	95.35
80	153,347	3.02	93.73	23.89	117.62	98.77
81	154,090	4.90	110.28	23.45	133.73	104.09
82	154,914	5.16	122.88	22.08	144.97	112.82
83	155,519	1.26	144.09	20.97	165.05	132.19
84	157,141	1.41	131.71	22.57	154.28	124.09
85	159,034	0.77	136.60	23.97	160.57	130.29
86	160,974	0.64	144.00	25.61	169.61	134.54
87	163,607	0.58	155.65	26.10	181.75	144.48
Annual Average Growth Rate	0.01094	-0.13511	0.08345	0.02738	0.07310	0.05506

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	146,739	3.58	101.80	29.04	130.84	123.23
78	151,206	3.40	107.19	30.19	137.38	121.10
79	152,763	3.20	107.17	28.44	135.61	118.30
80	153,347	3.41	105.79	26.96	132.76	111.48
81	154,090	4.90	110.28	23.45	133.73	104.09
82	154,914	4.65	110.60	19.88	130.48	101.55
83	155,519	1.07	122.73	17.86	140.59	112.60
84	157,141	1.16	108.05	18.51	126.56	101.79
85	159,034	0.61	108.15	18.98	127.13	103.16
86	160,974	0.49	110.77	19.70	130.47	103.49
87	163,607	0.43	115.47	19.36	134.83	107.18
Annual Average Growth Rate	0.01094	-0.19160	0.01268	-0.03972	0.00301	-0.01386

Table 5: Object of Municipal Revenue Fund Expenditures, Hamilton-Wentworth, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	2,089	3,991	2,170	1,997	0	0
	78	2,244	4,437	2,877	2,371	0	0
	79	2,565	4,342	3,480	2,808	0	0
	80	2,998	4,437	4,122	2,817	0	0
	81	3,245	5,159	5,341	3,248	0	0
	82	3,715	5,190	5,800	4,331	0	0
	83	3,998	5,145	5,354	6,991	0	920
	84	4,437	4,515	4,689	6,318	0	738
	85	4,398	4,631	4,876	6,877	0	942
	86	4,613	4,675	5,031	7,926	0	935
	87	5,207	4,444	5,394	9,384	0	1,037
STORM SEWERS	77	53	698	176	1,996	0	0
	78	34	1,117	203	2,006	0	0
	79	29	1,236	211	2,026	0	0
	80	43	1,264	106	2,250	0	0
	81	42	1,248	157	2,167	0	0
	82	315	1,220	41	1,846	0	0
	83	340	1,102	(78)	1,793	0	103
	84	341	876	27	2,260	0	43
	85	355	908	137	2,487	0	(74)
	86	359	916	0	2,777	0	71
	87	94	730	213	3,159	0	74
WATER	77	2,833	4,573	3,080	1,919	0	0
	78	2,958	4,893	3,665	1,962	0	0
	79	3,078	4,941	4,798	1,750	0	0
	80	3,407	5,016	4,810	1,913	0	0
	81	3,311	5,241	5,391	2,095	0	0
	82	3,856	5,297	6,438	1,887	0	0
	83	3,859	5,450	6,025	3,729	0	1,495
	84	4,264	4,864	5,336	2,987	0	2,049
	85	3,993	4,978	4,825	4,753	0	2,172
	86	4,347	5,075	4,874	5,151	0	2,211
	87	4,528	4,567	5,162	6,971	0	2,410
POLLUTION CONTROL	77	306	0	37	17	0	0
	78	329	0	31	19	0	0
	79	351	0	43	0	0	0
	80	398	0	59	7	0	0
	81	592	0	128	34	0	0
	82	646	0	134	20	0	0
	83	733	0	(57)	14	0	(494)
	84	792	0	96	37	0	(703)
	85	756	0	77	62	0	(773)
	86	835	0	110	22	0	(865)
	87	828	0	107	19	0	(860)

Table 5: Object of Municipal Revenue Fund Expenditures, Hamilton-Wentworth, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	3,046	5,818	3,164	2,910	0	0
	78	3,049	6,028	3,909	3,222	0	0
	79	3,182	5,386	4,318	3,484	0	0
	80	3,384	5,008	4,652	3,180	0	0
	81	3,245	5,159	5,341	3,248	0	0
	82	3,344	4,672	5,221	3,898	0	0
	83	3,405	4,382	4,561	5,955	0	784
	84	3,639	3,704	3,847	5,183	0	606
	85	3,482	3,667	3,861	5,445	0	746
	86	3,548	3,596	3,870	6,097	0	719
	87	3,863	3,296	4,002	6,961	0	769
STORM SEWERS	77	78	1,018	257	2,909	0	0
	78	46	1,517	276	2,726	0	0
	79	36	1,533	262	2,514	0	0
	80	49	1,427	119	2,539	0	0
	81	42	1,248	157	2,167	0	0
	82	284	1,098	37	1,661	0	0
	83	290	939	(66)	1,527	0	88
	84	279	719	22	1,854	0	36
	85	281	719	108	1,969	0	(58)
	86	276	704	0	2,136	0	55
	87	70	542	158	2,343	0	55
WATER	77	4,129	6,667	4,489	2,797	0	0
	78	4,018	6,648	4,979	2,665	0	0
	79	3,819	6,130	5,953	2,171	0	0
	80	3,845	5,661	5,429	2,159	0	0
	81	3,311	5,241	5,391	2,095	0	0
	82	3,470	4,768	5,795	1,698	0	0
	83	3,287	4,643	5,132	3,176	0	1,273
	84	3,498	3,990	4,377	2,450	0	1,681
	85	3,161	3,942	3,820	3,763	0	1,720
	86	3,344	3,904	3,750	3,962	0	1,701
	87	3,359	3,388	3,830	5,171	0	1,788
POLLUTION CONTROL	77	446	0	54	25	0	0
	78	446	0	42	26	0	0
	79	435	0	54	0	0	0
	80	449	0	66	7	0	0
	81	592	0	128	34	0	0
	82	581	0	121	18	0	0
	83	624	0	(49)	12	0	(421)
	84	650	0	79	30	0	(577)
	85	599	0	61	49	0	(612)
	86	643	0	84	17	0	(665)
	87	614	0	80	14	0	(638)

Table 6: Distribution of Municipal Revenue Fund Expenditures, Hamilton-Wentworth, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	20.39	38.95	21.18	19.48	0.00	0.00
	78	18.81	37.19	24.12	19.88	0.00	0.00
	79	19.44	32.90	26.38	21.28	0.00	0.00
	80	20.86	30.87	28.67	19.60	0.00	0.00
	81	19.10	30.36	31.43	19.11	0.00	0.00
	82	19.52	27.26	30.47	22.75	0.00	0.00
	83	17.84	22.96	23.89	31.20	0.00	4.11
	84	21.44	21.82	22.66	30.53	0.00	3.57
	85	20.25	21.32	22.45	31.66	0.00	4.33
	86	19.90	20.17	21.70	34.19	0.00	4.03
	87	20.45	17.45	21.18	36.85	0.00	4.07
STORM SEWERS	77	1.82	23.88	6.03	68.27	0.00	0.00
	78	1.01	33.24	6.04	59.71	0.00	0.00
	79	0.84	35.29	6.03	57.85	0.00	0.00
	80	1.19	34.51	2.88	61.42	0.00	0.00
	81	1.15	34.52	4.36	59.97	0.00	0.00
	82	9.21	35.65	1.19	53.95	0.00	0.00
	83	10.43	33.79	(2.38)	54.99	0.00	3.17
	84	9.60	24.70	0.75	63.72	0.00	1.22
	85	9.30	23.81	3.58	65.24	0.00	(1.93)
	86	8.71	22.21	0.00	67.36	0.00	1.72
	87	2.21	17.10	4.99	73.97	0.00	1.72
WATER	77	22.84	36.87	24.83	15.47	0.00	0.00
	78	21.94	36.31	27.19	14.56	0.00	0.00
	79	21.13	33.92	32.34	12.01	0.00	0.00
	80	22.49	33.12	31.76	12.63	0.00	0.00
	81	20.65	32.68	33.61	13.06	0.00	0.00
	82	22.06	30.31	36.84	10.79	0.00	0.00
	83	18.77	26.51	29.31	18.14	0.00	7.27
	84	21.87	24.94	27.37	15.32	0.00	10.51
	85	19.27	24.03	23.29	22.94	0.00	10.48
	86	20.07	23.43	22.51	23.78	0.00	10.21
	87	19.15	19.32	21.84	29.49	0.00	10.20
POLLUTION CONTROL	77	84.86	0.00	10.33	4.81	0.00	0.00
	78	86.77	0.00	8.09	5.14	0.00	0.00
	79	88.98	0.00	11.02	0.00	0.00	0.00
	80	85.94	0.00	12.65	1.41	0.00	0.00
	81	78.54	0.00	16.96	4.50	0.00	0.00
	82	80.72	0.00	16.79	2.49	0.00	0.00
	83	373.87	0.00	(29.08)	7.19	0.00	(251.98)
	84	357.56	0.00	43.29	16.63	0.00	(317.48)
	85	619.71	0.00	63.45	50.46	0.00	(633.61)
	86	814.37	0.00	106.79	21.84	0.00	(842.99)
	87	879.51	0.00	114.10	20.18	0.00	(913.78)

Table 7: Sources of Capital Financing for Water and Sewers, Hamilton-Wentworth, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	195	0	0	8,489	8,683
	78	36	0	0	7,019	7,055
	79	1,586	0	0	2,577	4,163
	80	558	0	0	5,998	6,556
	81	1,569	0	0	2,820	4,389
	82	474	0	0	7,250	7,724
	83	1,613	0	0	9,132	10,745
	84	2,201	1,070	0	5,996	9,267
	85	1,017	0	0	4,632	5,649
	86	128	0	0	8,305	8,432
	87	1,106	0	0	11,359	12,464
STORM SEWERS	77	0	0	0	1,956	1,956
	78	0	0	0	8,176	8,176
	79	4,297	0	0	1,694	5,991
	80	811	0	0	502	1,313
	81	504	0	0	(3)	502
	82	51	0	0	1,491	1,542
	83	550	0	0	1,211	1,761
	84	1,719	0	0	5,625	7,343
	85	365	0	0	4,879	5,244
	86	900	0	0	4,776	5,676
	87	1,094	0	0	2,362	3,455
WATER	77	997	0	0	5,276	6,272
	78	52	0	0	5,512	5,564
	79	1,688	0	0	4,028	5,716
	80	(759)	0	0	5,025	4,265
	81	469	465	0	3,151	4,085
	82	204	0	0	3,151	3,354
	83	1,623	0	0	6,789	8,413
	84	24	6	0	4,810	4,840
	85	451	0	0	6,133	6,584
	86	226	0	0	4,762	4,988
	87	193	0	0	5,918	6,111
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 7: Sources of Capital Financing for Water and Sewers, Hamilton-Wentworth, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	284	0	0	12,374	12,658
	78	49	0	0	9,537	9,586
	79	1,968	0	0	3,197	5,165
	80	630	0	0	6,770	7,400
	81	1,569	0	0	2,820	4,389
	82	427	0	0	6,525	6,952
	83	1,374	0	0	7,779	9,153
	84	1,806	878	0	4,919	7,602
	85	805	0	0	3,667	4,473
	86	98	0	0	6,388	6,486
	87	820	0	0	8,426	9,247
STORM SEWERS	77	0	0	0	2,852	2,852
	78	0	0	0	11,108	11,108
	79	5,331	0	0	2,101	7,432
	80	916	0	0	566	1,482
	81	504	0	0	(3)	502
	82	46	0	0	1,342	1,388
	83	469	0	0	1,031	1,500
	84	1,410	0	0	4,614	6,024
	85	289	0	0	3,863	4,152
	86	692	0	0	3,674	4,366
	87	811	0	0	1,752	2,563
WATER	77	1,453	0	0	7,690	9,143
	78	70	0	0	7,490	7,560
	79	2,094	0	0	4,998	7,092
	80	(857)	0	0	5,671	4,814
	81	469	465	0	3,151	4,085
	82	183	0	0	2,836	3,019
	83	1,383	0	0	5,783	7,166
	84	20	5	0	3,946	3,971
	85	357	0	0	4,856	5,213
	86	174	0	0	3,663	3,837
	87	143	0	0	4,390	4,533
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 8: Distribution of Capital Financing for Water & Sewer, Hamilton-Wentworth, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	2.24	0.00	0.00	97.76
	78	0.51	0.00	0.00	99.49
	79	38.10	0.00	0.00	61.90
	80	8.52	0.00	0.00	91.48
	81	35.75	0.00	0.00	64.25
	82	6.14	0.00	0.00	93.86
	83	15.01	0.00	0.00	84.99
	84	23.75	11.54	0.00	64.70
	85	18.01	0.00	0.00	81.99
	86	1.52	0.00	0.00	98.48
	87	8.87	0.00	0.00	91.13
STORM SEWERS	77	0.00	0.00	0.00	100.00
	78	0.00	0.00	0.00	100.00
	79	71.73	0.00	0.00	28.27
	80	61.79	0.00	0.00	38.21
	81	100.52	0.00	0.00	(0.52)
	82	3.30	0.00	0.00	96.70
	83	31.25	0.00	0.00	68.75
	84	23.41	0.00	0.00	76.59
	85	6.95	0.00	0.00	93.05
	86	15.86	0.00	0.00	84.14
	87	31.65	0.00	0.00	68.35
WATER	77	15.89	0.00	0.00	84.11
	78	0.93	0.00	0.00	99.07
	79	29.53	0.00	0.00	70.47
	80	(17.80)	0.00	0.00	117.80
	81	11.47	11.38	0.00	77.15
	82	6.07	0.00	0.00	93.93
	83	19.30	0.00	0.00	80.70
	84	0.50	0.13	0.00	99.37
	85	6.85	0.00	0.00	93.15
	86	4.53	0.00	0.00	95.47
	87	3.16	0.00	0.00	96.84
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00

Table 9: Net Long Term Liabilities for Water and Sewers, Hamilton-Wentworth, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS			
	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
80	33,405	7,566	30,643	5,696
81	38,829	7,034	30,841	5,275
82	39,363	6,475	31,595	4,830
83	36,365	5,892	29,060	0
84	34,560	5,430	26,696	0
85	32,622	4,935	24,192	0
86	30,640	4,439	21,459	0
87	28,779	4,048	18,665	0

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Hamilton-Wentworth, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	0		0
	78	2		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	39
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	1		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		29
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	0		0
	78	3		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	32
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	1		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		25
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Hamilton-Wentworth, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	(1,049)	5,609	0
81	(1,327)	5,404	528
82	(1,632)	5,346	531
83	(1,949)	5,320	528
84	(2,234)	5,249	528
85	(2,393)	5,218	524
86	190	5,180	524
87	5,143	0	523
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Hamilton-Wentworth, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CONSTANT 1981 THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	(1,184)	6,331	0
81	(1,327)	5,404	528
82	(1,469)	4,812	478
83	(1,660)	4,532	450
84	(1,833)	4,306	433
85	(1,894)	4,131	415
86	146	3,985	403
87	3,815	0	388
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Hamilton-Wentworth, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Hamilton - Wentworth											
78	11,566	11,132	30	206		75			873	(917)	22,963
83	18,307	21,075	3,027	103		49	94		1,339	(9,787)	34,205
84	17,069	19,314	3,261	85		241		1,160	343	(8,804)	32,668
85	18,146	20,323	3,499	41		114		1,229	430	(11,107)	32,675
86	18,642	21,584	3,735	27		182		1,359	832	(12,799)	33,562
87	23,260	23,360	3,984	8		142		1,954	818	(16,229)	34,314

MUNICIPALITY OF
METROPOLITAN TORONTO

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Toronto, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	29,920	0	29,920	34,291
78	0	40,428	0	40,428	24,695
79	0	28,537	0	28,537	20,330
80	0	12,954	0	12,954	8,374
81	0	12,759	435	13,194	9,324
82	0	22,081	172	22,253	8,109
83	0	22,044	0	22,044	6,159
84	0	22,252	0	22,252	7,340
85	0	22,123	0	22,123	4,188
86	0	22,340	11	22,351	8,212
87	0	24,892	0	24,892	5,794

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	43,616	0	43,616	49,987
78	0	54,929	0	54,929	33,553
79	0	35,406	0	35,406	25,223
80	0	14,621	0	14,621	9,451
81	0	12,759	435	13,194	9,324
82	0	19,875	155	20,030	7,299
83	0	18,777	0	18,777	5,246
84	0	18,254	0	18,254	6,021
85	0	17,516	0	17,516	3,316
86	0	17,185	8	17,193	6,317
87	0	18,466	0	18,466	4,298

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Toronto, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	769,935	0.00	38.86	0.00	38.86	44.54
78	779,452	0.00	51.87	0.00	51.87	31.68
79	793,497	0.00	35.96	0.00	35.96	25.62
80	805,183	0.00	16.09	0.00	16.09	10.40
81	814,556	0.00	15.66	0.53	16.20	11.45
82	821,570	0.00	26.88	0.21	27.09	9.87
83	830,044	0.00	26.56	0.00	26.56	7.42
84	837,207	0.00	26.58	0.00	26.58	8.77
85	842,266	0.00	26.27	0.00	26.27	4.97
86	847,353	0.00	26.36	0.01	26.38	9.69
87	855,161	0.00	29.11	0.00	29.11	6.78

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	769,935	0.00	56.65	0.00	56.65	64.92
78	779,452	0.00	70.47	0.00	70.47	43.05
79	793,497	0.00	44.62	0.00	44.62	31.79
80	805,183	0.00	18.16	0.00	18.16	11.74
81	814,556	0.00	15.66	0.53	16.20	11.45
82	821,570	0.00	24.19	0.19	24.38	8.88
83	830,044	0.00	22.62	0.00	22.62	6.32
84	837,207	0.00	21.80	0.00	21.80	7.19
85	842,266	0.00	20.80	0.00	20.80	3.94
86	847,353	0.00	20.28	0.01	20.29	7.45
87	855,161	0.00	21.59	0.00	21.59	5.03

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Toronto, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	14	35,057	112	35,168	41,732
78	9	41,813	111	41,924	43,311
79	9	54,245	65	54,310	46,072
80	9	60,582	50	60,632	53,120
81	0	70,087	334	70,421	56,062
82	0	74,796	24	74,820	62,509
83	0	74,213	24	74,237	68,082
84	62	85,364	24	85,388	67,918
85	73	95,561	3	95,564	82,993
86	15	92,708	2	92,710	96,237
87	24	98,202	2	98,204	77,503
Annual Average Growth Rate	0.05538	0.10850	-0.33121	0.10815	0.06386

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	20	51,103	163	51,266	60,834
78	12	56,811	151	56,962	58,846
79	11	67,301	81	67,382	57,161
80	10	68,377	56	68,433	59,955
81	0	70,087	334	70,421	56,062
82	0	67,323	22	67,345	56,264
83	0	63,214	20	63,234	57,991
84	51	70,028	20	70,048	55,716
85	58	75,662	2	75,664	65,711
86	12	71,314	2	71,315	74,028
87	18	72,850	1	72,852	57,495
Annual Average Growth Rate	-0.01356	0.03609	-0.37489	0.03576	-0.00563

Table 4: Municipal Revenue Fund Expenditures per Household on Water & Sewers, Toronto, 1977-1987

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	769,935	0.02	45.53	0.15	45.68	54.20
78	779,452	0.01	53.64	0.14	53.79	55.57
79	793,497	0.01	68.36	0.08	68.44	58.06
80	805,183	0.01	75.24	0.06	75.30	65.97
81	814,556	0.00	86.04	0.41	86.45	68.83
82	821,570	0.00	91.04	0.03	91.07	76.08
83	830,044	0.00	89.41	0.03	89.44	82.02
84	837,207	0.07	101.96	0.03	101.99	81.12
85	842,266	0.09	113.46	0.00	113.46	98.54
86	847,353	0.02	109.41	0.00	109.41	113.57
87	855,161	0.03	114.83	0.00	114.84	90.63
Annual Average Growth Rate	0.1055	0.4436	0.09692	-0.33819	0.09657	0.05275

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	769,935	0.03	66.37	0.21	66.58	79.01
78	779,452	0.02	72.89	0.19	73.08	75.50
79	793,497	0.01	84.82	0.10	84.92	72.04
80	805,183	0.01	84.92	0.07	84.99	74.46
81	814,556	0.00	86.04	0.41	86.45	68.83
82	821,570	0.00	81.94	0.03	81.97	68.48
83	830,044	0.00	76.16	0.02	76.18	69.87
84	837,207	0.06	83.64	0.02	83.67	66.55
85	842,266	0.07	89.83	0.00	89.83	78.02
86	847,353	0.01	84.16	0.00	84.16	87.36
87	855,161	0.02	85.19	0.00	85.19	67.23
Annual Average Growth Rate	0.01055	-0.02386	0.02527	-0.38142	0.02495	-0.01601

Table 5: Object of Municipal Revenue Fund Expenditures, Toronto, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	10,607	13,895	10,118	382	0	54
	78	11,748	18,429	11,338	292	0	6
	79	13,189	20,112	12,180	8,757	0	7
	80	15,054	21,090	15,267	9,169	0	2
	81	17,435	22,328	16,393	13,904	0	27
	82	21,608	22,852	19,957	10,365	0	14
	83	24,231	24,970	21,517	5,731	0	(2,236)
	84	26,193	25,279	23,345	10,524	0	23
	85	27,556	30,974	26,701	10,284	0	46
	86	29,547	26,164	27,514	9,437	0	46
	87	31,947	26,535	29,283	10,417	0	20
STORM SEWERS	77	0	112	0	0	0	0
	78	0	111	0	0	0	0
	79	0	65	0	0	0	0
	80	0	50	0	0	0	0
	81	0	34	0	300	0	0
	82	0	24	0	0	0	0
	83	0	24	0	0	0	0
	84	0	24	0	0	0	0
	85	0	3	0	0	0	0
	86	0	2	0	0	0	0
	87	0	2	0	0	0	0
WATER	77	7,930	19,029	11,969	2,432	0	372
	78	8,687	21,211	10,943	2,267	0	203
	79	9,264	20,958	13,092	2,298	0	460
	80	10,305	22,176	15,721	4,354	0	564
	81	11,556	22,145	18,333	3,460	0	568
	82	14,155	22,775	20,119	4,632	0	828
	83	17,102	22,994	20,531	4,630	0	2,825
	84	16,251	22,655	23,748	4,673	0	591
	85	16,133	25,183	25,870	15,186	0	621
	86	17,474	20,171	28,775	29,209	0	608
	87	18,736	17,822	30,447	9,874	0	624
POLLUTION CONTROL	77	0	0	0	0	14	0
	78	0	0	0	0	9	0
	79	0	0	0	0	9	0
	80	0	0	0	0	9	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	47	0	15	0
	85	0	0	55	0	18	0
	86	0	0	0	0	15	0
	87	0	0	0	0	24	0

Table 5: Object of Municipal Operating Expenditures, Toronto, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	15,462	20,255	14,749	557	0	79
	78	15,962	25,039	15,405	397	0	8
	79	16,364	24,953	15,112	10,865	0	9
	80	16,991	23,804	17,231	10,349	0	2
	81	17,435	22,328	16,393	13,904	0	27
	82	19,449	20,569	17,963	9,329	0	13
	83	20,640	21,269	18,328	4,882	0	(1,905)
	84	21,487	20,737	19,151	8,633	0	19
	85	21,818	24,524	21,141	8,143	0	36
	86	22,728	20,126	21,165	7,259	0	35
	87	23,700	19,685	21,723	7,728	0	15
STORM SEWERS	77	0	163	0	0	0	0
	78	0	151	0	0	0	0
	79	0	81	0	0	0	0
	80	0	56	0	0	0	0
	81	0	34	0	300	0	0
	82	0	22	0	0	0	0
	83	0	20	0	0	0	0
	84	0	20	0	0	0	0
	85	0	2	0	0	0	0
	86	0	2	0	0	0	0
	87	0	1	0	0	0	0
WATER	77	11,560	27,739	17,447	3,545	0	543
	78	11,803	28,819	14,868	3,080	0	276
	79	11,494	26,002	16,243	2,851	0	571
	80	11,631	25,029	17,744	4,914	0	637
	81	11,556	22,145	18,333	3,460	0	568
	82	12,741	20,500	18,109	4,169	0	745
	83	14,567	19,586	17,488	3,944	0	2,406
	84	13,331	18,585	19,482	3,833	0	485
	85	12,774	19,939	20,483	12,024	0	492
	86	13,442	15,516	22,135	22,468	0	468
	87	13,899	13,221	22,587	7,325	0	463
POLLUTION CONTROL	77	0	0	0	0	20	0
	78	0	0	0	0	12	0
	79	0	0	0	0	11	0
	80	0	0	0	0	10	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	39	0	12	0
	85	0	0	44	0	14	0
	86	0	0	0	0	12	0
	87	0	0	0	0	18	0

Table 6: Distribution of Municipal Revenue Fund Expenditures, Toronto, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	30.26	39.64	28.86	1.09	0.00	0.16
	78	28.10	44.07	27.12	0.70	0.00	0.01
	79	24.31	37.08	22.45	16.14	0.00	0.01
	80	24.85	34.81	25.20	15.13	0.00	0.00
	81	24.88	31.86	23.39	19.84	0.00	0.04
	82	28.89	30.55	26.68	13.86	0.00	0.02
	83	32.65	33.65	28.99	7.72	0.00	(3.01)
	84	30.68	29.61	27.35	12.33	0.00	0.03
	85	28.84	32.41	27.94	10.76	0.00	0.05
	86	31.87	28.22	29.68	10.18	0.00	0.05
	87	32.53	27.02	29.82	10.61	0.00	0.02
STORM SEWERS	77	0.00	100.00	0.00	0.00	0.00	0.00
	78	0.00	100.00	0.00	0.00	0.00	0.00
	79	0.00	100.00	0.00	0.00	0.00	0.00
	80	0.00	100.00	0.00	0.00	0.00	0.00
	81	0.00	10.18	0.00	89.82	0.00	0.00
	82	0.00	100.00	0.00	0.00	0.00	0.00
	83	0.00	100.00	0.00	0.00	0.00	0.00
	84	0.00	100.00	0.00	0.00	0.00	0.00
	85	0.00	100.00	0.00	0.00	0.00	0.00
	86	0.00	100.00	0.00	0.00	0.00	0.00
	87	0.00	100.00	0.00	0.00	0.00	0.00
WATER	77	19.00	45.60	28.68	5.83	0.00	0.89
	78	20.06	48.97	25.27	5.23	0.00	0.47
	79	20.11	45.49	28.42	4.99	0.00	1.00
	80	19.40	41.75	29.60	8.20	0.00	1.06
	81	20.61	39.50	32.70	6.17	0.00	1.01
	82	22.64	36.43	32.19	7.41	0.00	1.32
	83	25.12	33.77	30.16	6.80	0.00	4.15
	84	23.93	33.36	34.97	6.88	0.00	0.87
	85	19.44	30.34	31.17	18.30	0.00	0.75
	86	18.16	20.96	29.90	30.35	0.00	0.63
	87	24.17	23.00	39.28	12.74	0.00	0.81
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00	100.00	0.00
	78	0.00	0.00	0.00	0.00	100.00	0.00
	79	0.00	0.00	0.00	0.00	100.00	0.00
	80	0.00	0.00	0.00	0.00	100.00	0.00
	81	0.00	0.00	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00	0.00	0.00
	84	0.00	0.00	75.81	0.00	24.19	0.00
	85	0.00	0.00	75.34	0.00	24.66	0.00
	86	0.00	0.00	0.00	0.00	100.00	0.00
	87	0.00	0.00	0.00	0.00	100.00	0.00

Table 7: Sources of Capital Financing for Water and Sewers, Toronto, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	5,746	7,421	0	16,753	29,920
	78	6,673	7,359	0	26,396	40,428
	79	3,872	4,699	0	19,966	28,537
	80	2,008	1,376	0	9,570	12,954
	81	4,550	304	0	7,905	12,759
	82	4,814	0	0	17,267	22,081
	83	617	0	0	21,427	22,044
	84	2,049	0	0	20,203	22,252
	85	2,202	0	0	19,921	22,123
	86	782	0	0	21,558	22,340
	87	2,324	0	0	22,568	24,892
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	435	435
	82	0	0	0	172	172
	83	29	0	0	(29)	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	11	11
	87	0	0	0	0	0
WATER	77	6,651	2,578	0	25,062	34,291
	78	5,019	2,006	0	17,669	24,695
	79	3,864	1,698	0	14,768	20,330
	80	1,227	224	0	6,923	8,374
	81	2,552	0	0	6,772	9,324
	82	3,613	0	0	4,496	8,109
	83	547	0	0	5,612	6,159
	84	904	0	0	6,436	7,340
	85	1,113	0	0	3,075	4,188
	86	597	0	0	7,615	8,212
	87	846	0	0	4,948	5,794
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 7: Sources of Capital Financing for Water and Sewers, Toronto, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	8,376	10,818	0	24,421	43,616
	78	9,066	9,998	0	35,865	54,929
	79	4,804	5,830	0	24,772	35,406
	80	2,266	1,553	0	10,801	14,621
	81	4,550	304	0	7,905	12,759
	82	4,333	0	0	15,542	19,875
	83	526	0	0	18,251	18,777
	84	1,681	0	0	16,573	18,254
	85	1,743	0	0	15,773	17,516
	86	602	0	0	16,583	17,185
	87	1,724	0	0	16,742	18,466
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	435	435
	82	0	0	0	155	155
	83	25	0	0	(25)	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	8	8
	87	0	0	0	0	0
WATER	77	9,696	3,757	0	36,534	49,987
	78	6,820	2,726	0	24,007	33,553
	79	4,794	2,107	0	18,323	25,223
	80	1,385	253	0	7,814	9,451
	81	2,552	0	0	6,772	9,324
	82	3,252	0	0	4,047	7,299
	83	466	0	0	4,780	5,246
	84	742	0	0	5,280	6,021
	85	881	0	0	2,435	3,316
	86	459	0	0	5,858	6,317
	87	628	0	0	3,671	4,298
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 8: Distribution of Capital Financing for Water & Sewer, Toronto, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNICIP	OWN SOURCES
SANITARY SEWERS	77	19.20	24.80	0.00	55.99
	78	16.51	18.20	0.00	65.29
	79	13.57	16.47	0.00	69.97
	80	15.50	10.62	0.00	73.88
	81	35.66	2.38	0.00	61.96
	82	21.80	0.00	0.00	78.20
	83	2.80	0.00	0.00	97.20
	84	9.21	0.00	0.00	90.79
	85	9.95	0.00	0.00	90.05
	86	3.50	0.00	0.00	96.50
	87	9.34	0.00	0.00	90.66
STORM SEWERS	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	100.00
	82	0.00	0.00	0.00	100.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	100.00
	87	0.00	0.00	0.00	0.00
WATER	77	19.40	7.52	0.00	73.09
	78	20.33	8.12	0.00	71.55
	79	19.01	8.35	0.00	72.64
	80	14.65	2.67	0.00	82.67
	81	27.37	0.00	0.00	72.63
	82	44.56	0.00	0.00	55.44
	83	8.88	0.00	0.00	91.12
	84	12.32	0.00	0.00	87.68
	85	26.58	0.00	0.00	73.42
	86	7.27	0.00	0.00	92.73
	87	14.60	0.00	0.00	85.40
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00

Table 9: Net Long Term Liabilities for Water and Sewers, Toronto, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
80	156,806	91	112,217	0
81	150,249	70	106,143	0
82	146,506	48	96,323	0
83	139,174	26	85,928	0
84	132,313	2	75,575	0
85	121,729	0	65,875	0
86	121,100	0	56,568	0
87	119,657	0	47,393	0

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Toronto, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	1,195		0
	78	0		0
	79	1,657		0
	80	1,771		0
	81	2,016		0
	82	0		0
	83	2,606		0
	84	2,457	0	0
	85	3,187	0	0
	86	2,825	0	0
	87	2,431	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	1,743		0
	78	0		0
	79	2,056		0
	80	1,999		0
	81	2,016		0
	82	0		0
	83	2,220		0
	84	2,016	0	0
	85	2,523	0	0
	86	2,173	0	0
	87	1,803	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Toronto, 1980-1987

	CURRENT YEAR THOUSAND DOLLARS		
FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Toronto, 1980-1987

	CONSTANT 1981 THOUSAND DOLLARS		
FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Toronto, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Toronto											
78	23,247	4,957	42,975		2	1,115		599	5,660	53,954	132.509
83	32,004	11,259	108,816		2	2,093	444	585	10,754	41,579	207,535
84	39,731	13,125	118,926		2	1,983	628	762	12,403	31,710	219,269
85	42,764	14,309	133,296		2	1,703		799	14,198	31,653	238,724
86	46,370	15,250	807		0.006	2,160		546	16,455	159,051	240,640
87	55,726	12,130	149,639		0.9	2,393		1,008	19,967	332	241,396

DISTRICT MUNICIPALITY OF MUSKOKA

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Muskoka, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	767	0	767	798
78	0	907	0	907	431
79	0	94	0	94	656
80	0	499	0	499	392
81	0	2,181	0	2,181	5,141
82	0	3,325	0	3,325	5,206
83	0	2,750	0	2,750	1,116
84	0	434	0	434	1,028
85	0	1,385	0	1,385	258
86	0	2,881	0	2,881	1,509
87	0	751	0	751	2,999

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	1,118	0	1,118	1,164
78	0	1,233	0	1,233	586
79	0	117	0	117	814
80	0	563	0	563	442
81	0	2,181	0	2,181	5,141
82	0	2,993	0	2,993	4,685
83	0	2,342	0	2,342	951
84	0	356	0	356	843
85	0	1,096	0	1,096	204
86	0	2,216	0	2,216	1,161
87	0	557	0	557	2,225

Table 2: Municipal Capital Fund Expenditures per Household on Water & Sewers, Muskoka, 1977-1987

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	31,467	0.00	24.36	0.00	24.36	25.37
78	32,046	0.00	28.31	0.00	28.31	13.46
79	32,681	0.00	2.88	0.00	2.88	20.09
80	33,245	0.00	15.02	0.00	15.02	11.78
81	33,505	0.00	65.08	0.00	65.08	153.43
82	33,604	0.00	98.94	0.00	98.94	154.91
83	33,870	0.00	81.18	0.00	81.18	32.95
84	34,155	0.00	12.70	0.00	12.70	30.10
85	34,534	0.00	40.09	0.00	40.09	7.46
86	35,113	0.00	82.04	0.00	82.04	42.97
87	35,398	0.00	21.22	0.00	21.22	84.72

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	31,467	0.00	35.51	0.00	35.51	36.98
78	32,046	0.00	38.47	0.00	38.47	18.29
79	32,681	0.00	3.57	0.00	3.57	24.92
80	33,245	0.00	16.95	0.00	16.95	13.29
81	33,505	0.00	65.08	0.00	65.08	153.43
82	33,604	0.00	89.06	0.00	89.06	139.43
83	33,870	0.00	69.15	0.00	69.15	28.07
84	34,155	0.00	10.42	0.00	10.42	24.69
85	34,534	0.00	31.74	0.00	31.74	5.91
86	35,113	0.00	63.11	0.00	63.11	33.05
87	35,398	0.00	15.75	0.00	15.75	62.85

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Muskoka, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	823	0	823	665
78	0	1,113	0	1,113	852
79	0	1,055	0	1,055	923
80	0	1,180	0	1,180	1,085
81	0	1,281	0	1,281	1,364
82	0	1,610	0	1,610	1,772
83	0	1,783	0	1,783	1,924
84	0	2,094	0	2,094	2,047
85	440	1,786	0	1,786	2,340
86	447	1,987	0	1,987	2,658
87	625	2,328	0	2,328	2,764
Annual Average Growth Rate	0.19206	0.10967	0.00000	0.10967	0.15310

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	1,199	0	1,199	969
78	0	1,512	0	1,512	1,158
79	0	1,310	0	1,310	1,145
80	0	1,332	0	1,332	1,225
81	0	1,281	0	1,281	1,364
82	0	1,449	0	1,449	1,595
83	0	1,519	0	1,519	1,639
84	0	1,718	0	1,718	1,680
85	348	1,414	0	1,414	1,852
86	344	1,528	0	1,528	2,044
87	464	1,727	0	1,727	2,050
Annual Average Growth Rate	0.15386	0.03718	0.00000	0.03718	0.07778

Table 4: **Municipal Revenue Fund Expenditures per Household on Water & Sewers, Muskoka, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	31,467	0.00	26.14	0.00	26.14	21.13
78	32,046	0.00	34.73	0.00	34.73	26.60
79	32,681	0.00	32.30	0.00	32.30	28.23
80	33,245	0.00	35.50	0.00	35.50	32.65
81	33,505	0.00	38.23	0.00	38.23	40.70
82	33,604	0.00	47.92	0.00	47.92	52.72
83	33,870	0.00	52.65	0.00	52.65	56.80
84	34,155	0.00	61.32	0.00	61.32	59.94
85	34,534	12.74	51.71	0.00	51.71	67.75
86	35,113	12.72	56.58	0.00	56.58	75.69
87	35,398	17.66	65.78	0.00	65.78	78.07
Annual Average Growth Rate	0.01184	0.17742	0.09668	0.00000	0.09668	0.13961

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	31,467	0.00	38.10	0.00	38.10	30.81
78	32,046	0.00	47.18	0.00	47.18	36.14
79	32,681	0.00	40.07	0.00	40.07	35.03
80	33,245	0.00	40.06	0.00	40.06	36.85
81	33,505	0.00	38.23	0.00	38.23	40.70
82	33,604	0.00	43.13	0.00	43.13	47.45
83	33,870	0.00	44.84	0.00	44.84	48.38
84	34,155	0.00	50.30	0.00	50.30	49.17
85	34,534	10.09	40.94	0.00	40.94	53.64
86	35,113	9.78	43.53	0.00	43.53	58.22
87	35,398	13.10	48.80	0.00	48.80	57.92
Annual Average Growth Rate	0.01184	0.13969	0.02505	0.00000	0.02505	0.06517

Table 5: Object of Municipal Revenue Fund Expenditures, Muskoka, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	17	214	334	257	0	0
	78	26	176	658	228	0	25
	79	83	211	440	281	0	41
	80	100	212	554	264	0	49
	81	100	211	519	384	0	67
	82	145	260	750	377	0	77
	83	298	370	636	365	0	113
	84	122	446	925	520	0	81
	85	141	443	1,120	81	0	0
	86	391	469	858	269	0	0
	87	414	806	922	187	0	0
STORM SEWERS	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	0	0	0
	86	0	0	0	0	0	0
	87	0	0	0	0	0	0
WATER	77	7	165	474	18	0	0
	78	0	185	541	110	0	17
	79	8	257	540	49	0	68
	80	28	256	648	115	0	39
	81	152	251	671	251	0	38
	82	204	543	727	244	0	53
	83	377	707	499	260	0	80
	84	191	749	784	244	0	79
	85	199	706	1,028	406	0	0
	86	444	738	940	536	0	0
	87	451	762	978	573	0	0
POLLUTION CONTROL	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	440	0	0
	86	0	0	0	447	0	0
	87	0	0	0	625	0	0

Table 5: Object of Municipal Revenue Fund Expenditures, Muskoka, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	25	313	487	375	0	0
	78	35	239	894	310	0	34
	79	103	262	545	348	0	51
	80	113	239	626	298	0	56
	81	100	211	519	384	0	67
	82	131	234	675	339	0	70
	83	254	315	542	311	0	97
	84	100	366	759	426	0	67
	85	112	351	887	64	0	0
	86	301	361	660	207	0	0
	87	307	598	684	139	0	0
STORM SEWERS	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	0	0	0
	86	0	0	0	0	0	0
	87	0	0	0	0	0	0
WATER	77	11	241	691	27	0	0
	78	0	251	735	150	0	23
	79	10	319	670	61	0	84
	80	31	289	731	130	0	44
	81	152	251	671	251	0	38
	82	184	489	655	219	0	48
	83	321	602	425	222	0	69
	84	157	614	643	200	0	65
	85	158	559	814	322	0	0
	86	342	568	723	412	0	0
	87	335	565	726	425	0	0
POLLUTION CONTROL	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	348	0	0
	86	0	0	0	344	0	0
	87	0	0	0	464	0	0

Table 6: Distribution of Municipal Revenue Fund Expenditures, Muskoka, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	2.05	26.08	40.61	31.26	0.00	0.00
	78	2.30	15.78	59.12	20.53	0.00	2.27
	79	7.90	20.00	41.64	26.59	0.00	3.86
	80	8.49	17.96	46.98	22.38	0.00	4.19
	81	7.83	16.50	40.51	29.96	0.00	5.20
	82	9.01	16.17	46.59	23.42	0.00	4.81
	83	16.73	20.73	35.68	20.49	0.00	6.36
	84	5.84	21.30	44.15	24.82	0.00	3.88
	85	7.91	24.81	62.72	4.56	0.00	0.00
	86	19.69	23.61	43.17	13.53	0.00	0.00
	87	17.78	34.62	39.58	8.02	0.00	0.00
STORM SEWERS	77	0.00	0.00	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00	0.00	0.00
WATER	77	1.10	24.86	71.29	2.75	0.00	0.00
	78	0.00	21.68	63.45	12.93	0.00	1.95
	79	0.85	27.85	58.56	5.36	0.00	7.37
	80	2.56	23.58	59.67	10.60	0.00	3.59
	81	11.12	18.43	49.23	18.39	0.00	2.82
	82	11.53	30.65	41.05	13.75	0.00	3.01
	83	19.61	36.73	25.95	13.53	0.00	4.18
	84	9.35	36.57	38.28	11.93	0.00	3.87
	85	8.51	30.16	43.96	17.37	0.00	0.00
	86	16.71	27.77	35.37	20.15	0.00	0.00
	87	16.32	27.57	35.39	20.72	0.00	0.00
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	100.00	0.00	0.00
	86	0.00	0.00	0.00	100.00	0.00	0.00
	87	0.00	0.00	0.00	100.00	0.00	0.00

Table 7: Sources of Capital Financing for Water and Sewers, Muskoka, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	15	19	0	732	767
	78	22	40	0	846	907
	79	57	0	0	37	94
	80	285	0	3	212	499
	81	996	0	28	1,157	2,181
	82	1,601	59	121	1,544	3,325
	83	1,217	327	0	1,206	2,750
	84	475	0	0	(41)	434
	85	329	0	0	1,056	1,385
	86	442	0	51	2,388	2,881
	87	167	0	8	577	751
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	0	0	0	798	798
	78	56	30	0	345	431
	79	252	0	99	306	656
	80	43	0	0	349	392
	81	2,678	0	45	2,418	5,141
	82	3,214	0	222	1,769	5,206
	83	1,225	0	59	(168)	1,116
	84	415	0	0	613	1,028
	85	0	0	0	258	258
	86	820	0	0	689	1,509
	87	1,399	0	158	1,442	2,999
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 7: Sources of Capital Financing for Water and Sewers, Muskoka, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	23	28	0	1,067	1,118
	78	29	54	0	1,149	1,233
	79	71	0	0	45	117
	80	321	0	3	239	563
	81	996	0	28	1,157	2,181
	82	1,441	53	109	1,390	2,993
	83	1,037	278	0	1,027	2,342
	84	389	0	0	(34)	356
	85	260	0	0	836	1,096
	86	340	0	39	1,837	2,216
	87	124	0	6	428	557
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	0	0	0	1,164	1,164
	78	76	41	0	469	586
	79	312	0	123	380	814
	80	48	0	0	394	442
	81	2,678	0	45	2,418	5,141
	82	2,893	0	200	1,593	4,685
	83	1,043	0	50	(143)	951
	84	340	0	0	503	843
	85	0	0	0	204	204
	86	630	0	0	530	1,161
	87	1,038	0	117	1,070	2,225
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 8: Distribution of Capital Financing for Water & Sewer, Muskoka, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	2.01	2.51	0.00	95.48
	78	2.38	4.41	0.00	93.21
	79	61.01	0.00	0.00	38.99
	80	57.04	0.00	0.59	42.38
	81	45.68	0.00	1.27	53.05
	82	48.15	1.77	3.64	46.44
	83	44.27	11.88	0.00	43.85
	84	109.44	0.00	0.00	(9.44)
	85	23.74	0.00	0.00	76.26
	86	15.35	0.00	1.75	82.90
	87	22.24	0.00	1.00	76.76
STORM SEWERS	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00
WATER	77	0.00	0.00	0.00	100.00
	78	12.93	7.05	0.00	80.01
	79	38.31	0.00	15.06	46.63
	80	10.90	0.00	0.00	89.10
	81	52.10	0.00	0.87	47.03
	82	61.74	0.00	4.26	33.99
	83	109.74	0.00	5.27	(15.01)
	84	40.36	0.00	0.00	59.64
	85	0.00	0.00	0.00	100.00
	86	54.32	0.00	0.00	45.68
	87	46.64	0.00	5.27	48.08
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00

Table 9: Net Long Term Liabilities for Water and Sewers, Muskoka, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
80	1,367	0	1,622	0
81	1,491	0	3,080	0
82	1,972	0	3,945	0
83	2,259	0	3,865	0
84	2,069	0	3,651	0
85	2,066	0	3,617	0
86	4,099	0	3,633	0
87	3,871	0	3,373	0

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Muskoka, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	1		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	69		0
	78	400		0
	79	119		0
	80	172		0
	81	100		0
	82	168		0
	83	215		0
	84	215	0	0
	85	215	0	0
	86	0	0	0
	87	0	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	1		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	101		0
	78	544		0
	79	148		0
	80	194		0
	81	100		0
	82	152		0
	83	184		0
	84	177	0	0
	85	170	0	0
	86	0	0	0
	87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Muskoka, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CURRENT YEAR THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	(24)	1,900	366
82	(35)	1,739	226
83	(43)	1,804	0
84	(53)	1,793	199
85	(76)	1,770	198
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Muskoka, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CONSTANT 1981 THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	(24)	1,900	366
82	(32)	1,565	203
83	(37)	1,537	0
84	(43)	1,471	164
85	(61)	1,401	157
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Muskoka, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Muskoka											
78	577	327	119					27	79	498	1,627
83	1,001	638	1,346					34	78	(16)	3,081
84	1,056	810	1,500					34	134	(158)	3,377
85	1,127	833	1,679						159	(146)	3,651
86	1,254	911	1,889						142	(347)	3,849
87	1,381	1,077	2,025						230	(377)	4,336

REGIONAL MUNICIPALITY OF
PEEL

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Peel, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1	2,535	0	2,535	2,964
78	0	4,570	0	4,570	10,002
79	0	9,676	0	9,676	7,817
80	0	12,072	0	12,072	8,893
81	0	21,996	0	21,996	5,137
82	4	27,821	0.	27,821	11,390
83	0	23,842	0	23,842	11,496
84	14	13,112	0	13,112	12,097
85	27	8,996	0	8,996	10,735
86	0	9,058	0	9,058	17,859
87	0	8,451	0	8,451	29,581

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1	3,696	0	3,696	4,320
78	0	6,210	0	6,210	13,589
79	0	12,005	0	12,005	9,698
80	0	13,625	0	13,625	10,037
81	0	21,996	0	21,996	5,137
82	3	25,041	0	25,041	10,252
83	0	20,309	0	20,309	9,792
84	11	10,757	0	10,757	9,923
85	21	7,123	0	7,123	8,500
86	0	6,968	0	6,968	13,738
87	0	6,269	0	6,269	21,944

Table 2: Municipal Capital Fund Expenditures per Household on Water & Sewers, Peel, 1977-1987

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	116,423	0.00	21.78	0.00	21.78	25.46
78	128,090	0.00	35.68	0.00	35.68	78.08
79	135,203	0.00	71.57	0.00	71.57	57.82
80	146,675	0.00	82.30	0.00	82.30	60.63
81	153,257	0.00	143.53	0.00	143.53	33.52
82	169,895	0.02	163.75	0.00	163.75	67.04
83	168,282	0.00	141.68	0.00	141.68	68.31
84	175,277	0.08	74.81	0.00	74.81	69.01
85	181,948	0.15	49.44	0.00	49.44	59.00
86	186,915	0.00	48.46	0.00	48.46	95.55
87	193,284	0.00	43.72	0.00	43.72	153.04

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	116,423	0.01	31.75	0.00	31.75	37.11
78	128,090	0.00	48.48	0.00	48.48	106.09
79	135,203	0.00	88.80	0.00	88.80	71.73
80	146,675	0.00	92.89	0.00	92.89	68.43
81	153,257	0.00	143.53	0.00	143.53	33.52
82	169,895	0.02	147.39	0.00	147.39	60.34
83	168,282	0.00	120.68	0.00	120.68	58.19
84	175,277	0.06	61.37	0.00	61.37	56.61
85	181,948	0.12	39.15	0.00	39.15	46.72
86	186,915	0.00	37.28	0.00	37.28	73.50
87	193,284	0.00	32.44	0.00	32.44	113.53

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Peel, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	164	11,030	0	11,030	11,822
78	578	13,381	0	13,381	13,900
79	598	15,581	0	15,581	16,593
80	881	15,862	0	15,862	17,605
81	579	20,531	0	20,531	21,273
82	408	23,151	0	23,151	24,032
83	323	28,762	0	28,762	26,128
84	362	29,578	0	29,578	28,411
85	415	34,842	0	34,842	33,151
86	648	35,671	0	35,671	35,721
87	701	40,192	0	40,192	40,953
Annual Average Growth Rate	0.15662	0.13803	0.00000	0.13803	0.13229

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	239	16,079	0	16,079	17,233
78	786	18,180	0	18,180	18,886
79	742	19,332	0	19,332	20,587
80	994	17,903	0	17,903	19,870
81	579	20,531	0	20,531	21,273
82	368	20,838	0	20,838	21,631
83	275	24,499	0	24,499	22,255
84	297	24,264	0	24,264	23,307
85	329	27,587	0	27,587	26,248
86	498	27,440	0	27,440	27,478
87	520	29,816	0	29,816	30,381
Annual Average Growth Rate	0.08107	0.06370	0.00000	0.06370	0.05833

Table 4: Municipal Revenue Fund Expenditures per Household on Water & Sewers, Peel, 1977-1987

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	116,423	1.41	94.74	0.00	94.74	101.54
78	128,090	4.52	104.46	0.00	104.46	108.52
79	135,203	4.42	115.24	0.00	115.24	122.73
80	146,675	6.01	108.14	0.00	108.14	120.03
81	153,257	3.78	133.96	0.00	133.96	138.81
82	169,895	2.40	136.27	0.00	136.27	141.45
83	168,282	1.92	170.91	0.00	170.91	155.26
84	175,277	2.07	168.75	0.00	168.75	162.09
85	181,948	2.28	191.50	0.00	191.50	182.20
86	186,915	3.47	190.84	0.00	190.84	191.11
87	193,284	3.63	207.94	0.00	207.94	211.88
Annual Average Growth Rate	0.05200	0.09945	0.08178	0.00000	0.08178	0.07632

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	116,423	2.05	138.11	0.00	138.11	148.02
78	128,090	6.14	141.93	0.00	141.93	147.45
79	135,203	5.49	142.98	0.00	142.98	152.27
80	146,675	6.78	122.06	0.00	122.06	135.47
81	153,257	3.78	133.96	0.00	133.96	138.81
82	169,895	2.16	122.65	0.00	122.65	127.32
83	168,282	1.64	145.58	0.00	145.58	132.25
84	175,277	1.70	138.43	0.00	138.43	132.97
85	181,948	1.81	151.62	0.00	151.62	144.26
86	186,915	2.67	146.80	0.00	146.80	147.01
87	193,284	2.69	154.26	0.00	154.26	157.18
Annual Average Growth Rate	0.05200	0.02764	0.01112	0.00000	0.01112	0.00602

Table 5: Object of Municipal Revenue Fund Expenditures, Peel, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	928	2,482	6,248	795	0	578
	78	982	2,653	7,575	1,650	0	521
	79	1,122	2,864	9,974	1,346	0	276
	80	712	3,313	10,122	1,445	0	270
	81	1,021	3,225	10,078	4,415	0	1,792
	82	1,165	5,191	12,062	3,074	0	1,659
	83	1,040	8,647	12,870	4,247	0	1,958
	84	1,217	9,008	12,960	4,294	0	2,100
	85	1,425	11,745	13,338	6,123	0	2,212
	86	1,288	13,051	13,550	5,478	0	2,305
	87	1,538	12,465	14,520	8,935	0	2,734
STORM SEWERS	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	0	0	0
	86	0	0	0	0	0	0
	87	0	0	0	0	0	0
WATER	77	1,927	720	6,543	1,667	0	966
	78	1,769	911	7,019	3,151	0	1,050
	79	1,951	1,251	9,721	2,643	0	1,027
	80	2,810	1,414	9,779	2,496	0	1,105
	81	3,217	1,486	11,164	4,763	0	643
	82	3,649	1,736	11,177	6,129	0	1,341
	83	3,802	2,024	12,021	7,301	0	980
	84	4,125	2,503	12,800	7,884	0	1,099
	85	4,656	3,118	12,773	11,059	0	1,545
	86	5,206	3,170	13,140	12,565	0	1,640
	87	5,587	3,059	13,896	17,191	0	1,220
POLLUTION CONTROL	77	129	0	32	2	0	0
	78	154	0	54	0	0	370
	79	169	1	57	0	0	371
	80	179	0	39	0	0	662
	81	273	65	425	1	0	(185)
	82	311	69	296	4	0	(271)
	83	349	0	264	4	0	(293)
	84	399	0	278	14	0	(328)
	85	438	58	226	26	15	(347)
	86	535	54	246	26	0	(213)
	87	569	51	415	33	0	(366)

Table 5: Object of Municipal Revenue Fund Expenditures, Peel, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	1,352	3,619	9,108	1,158	0	842
	78	1,334	3,604	10,292	2,241	0	708
	79	1,392	3,553	12,375	1,670	0	342
	80	803	3,740	11,425	1,631	0	304
	81	1,021	3,225	10,078	4,415	0	1,792
	82	1,049	4,672	10,857	2,767	0	1,493
	83	885	7,365	10,963	3,617	0	1,668
	84	998	7,390	10,631	3,522	0	1,723
	85	1,128	9,299	10,560	4,848	0	1,752
	86	991	10,039	10,423	4,214	0	1,773
	87	1,141	9,247	10,772	6,629	0	2,028
STORM SEWERS	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	0	0	0
	85	0	0	0	0	0	0
	86	0	0	0	0	0	0
	87	0	0	0	0	0	0
WATER	77	2,809	1,049	9,538	2,430	0	1,408
	78	2,404	1,238	9,536	4,282	0	1,427
	79	2,421	1,552	12,061	3,279	0	1,275
	80	3,172	1,596	11,037	2,817	0	1,247
	81	3,217	1,486	11,164	4,763	0	643
	82	3,284	1,562	10,061	5,516	0	1,207
	83	3,238	1,724	10,240	6,219	0	835
	84	3,384	2,053	10,500	6,468	0	902
	85	3,686	2,469	10,113	8,756	0	1,223
	86	4,005	2,438	10,108	9,665	0	1,262
	87	4,145	2,269	10,309	12,753	0	905
POLLUTION CONTROL	77	188	0	47	3	0	0
	78	209	0	74	0	0	503
	79	210	1	70	0	0	460
	80	202	0	44	0	0	748
	81	273	65	425	1	0	(185)
	82	280	62	266	3	0	(244)
	83	297	0	224	3	0	(249)
	84	327	0	228	11	0	(269)
	85	347	46	179	21	12	(275)
	86	411	42	189	20	0	(164)
	87	422	38	308	24	0	(272)

Table 6: Distribution of Municipal Revenue Fund Expenditures, Peel, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	8.41	22.51	56.64	7.20	0.00	5.24
	78	7.34	19.82	56.61	12.33	0.00	3.90
	79	7.20	18.38	64.01	8.64	0.00	1.77
	80	4.49	20.89	63.82	9.11	0.00	1.70
	81	4.97	15.71	49.09	21.51	0.00	8.73
	82	5.03	22.42	52.10	13.28	0.00	7.17
	83	3.61	30.06	44.75	14.77	0.00	6.81
	84	4.11	30.45	43.81	14.52	0.00	7.10
	85	4.09	33.71	38.28	17.57	0.00	6.35
	86	3.61	36.59	37.99	15.36	0.00	6.46
	87	3.83	31.01	36.13	22.23	0.00	6.80
STORM SEWERS	77	0.00	0.00	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00	0.00	0.00
WATER	77	16.30	6.09	55.34	14.10	0.00	8.17
	78	12.73	6.55	50.49	22.67	0.00	7.56
	79	11.76	7.54	58.58	15.93	0.00	6.19
	80	15.96	8.03	55.55	14.18	0.00	6.28
	81	15.12	6.99	52.48	22.39	0.00	3.02
	82	15.18	7.22	46.51	25.50	0.00	5.58
	83	14.55	7.75	46.01	27.94	0.00	3.75
	84	14.52	8.81	45.05	27.75	0.00	3.87
	85	14.04	9.41	38.53	33.36	0.00	4.66
	86	14.57	8.87	36.79	35.17	0.00	4.59
	87	13.64	7.47	33.93	41.98	0.00	2.98
POLLUTION CONTROL	77	78.93	0.00	19.67	1.41	0.00	0.00
	78	26.62	0.03	9.39	0.01	0.00	63.94
	79	28.35	0.12	9.47	0.00	0.00	62.05
	80	20.34	0.00	4.44	0.02	0.00	75.20
	81	47.08	11.31	73.40	0.21	0.00	(32.00)
	82	76.12	16.84	72.50	0.93	0.00	(66.39)
	83	107.79	0.00	81.50	1.18	0.00	(90.47)
	84	110.10	0.00	76.71	3.79	0.00	(90.60)
	85	105.41	13.86	54.36	6.32	3.61	(83.57)
	86	82.55	8.35	37.90	4.03	0.00	(32.84)
	87	81.07	7.21	59.22	4.69	0.00	(52.19)

Table 7: Sources of Capital Financing for Water and Sewers, Peel, 1977-1987

	FY	CURRENT YEAR THOUSAND DOLLARS ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	83	78	263	2,111	2,535
	78	350	167	71	3,983	4,570
	79	383	196	2	9,097	9,676
	80	1,641	722	0	9,708	12,072
	81	2,425	2,890	1	16,681	21,996
	82	3,978	2,993	0	20,850	27,821
	83	3,647	0	14	20,181	23,842
	84	1,137	0	0	11,975	13,112
	85	823	0	0	8,173	8,996
	86	324	0	0	8,734	9,058
	87	351	0	0	8,101	8,451
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	(19)	194	547	2,242	2,964
	78	783	529	42	8,647	10,002
	79	1,642	497	201	5,478	7,817
	80	671	674	0	7,548	8,893
	81	332	287	4	4,514	5,137
	82	1,214	210	30	9,936	11,390
	83	1,114	0	0	10,382	11,496
	84	1,030	0	0	11,067	12,097
	85	1,078	0	18	9,639	10,735
	86	1,580	0	(18)	16,297	17,859
	87	3,718	0	0	25,863	29,581
POLLUTION CONTROL	77	0	0	0	1	1
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	4	4
	83	0	0	0	0	0
	84	0	0	0	14	14
	85	0	0	0	27	27
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 7: Sources of Capital Financing for Water and Sewers, Peel, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	121	114	383	3,078	3,696
	78	476	226	96	5,411	6,210
	79	475	243	2	11,286	12,005
	80	1,853	815	0	10,957	13,625
	81	2,425	2,890	1	16,681	21,996
	82	3,581	2,694	0	18,767	25,041
	83	3,106	0	12	17,190	20,309
	84	933	0	0	9,824	10,757
	85	652	0	0	6,471	7,123
	86	249	0	0	6,719	6,968
	87	260	0	0	6,009	6,269
STORM SEWERS	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	0	0
	85	0	0	0	0	0
	86	0	0	0	0	0
	87	0	0	0	0	0
WATER	77	(28)	283	797	3,269	4,320
	78	1,064	719	58	11,749	13,589
	79	2,037	617	249	6,796	9,698
	80	758	760	0	8,519	10,037
	81	332	287	4	4,514	5,137
	82	1,093	189	27	8,943	10,252
	83	949	0	0	8,844	9,792
	84	845	0	0	9,079	9,923
	85	853	0	15	7,632	8,500
	86	1,216	0	(14)	12,536	13,738
	87	2,758	0	0	19,186	21,944
POLLUTION CONTROL	77	0	0	0	1	1
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	3	3
	83	0	0	0	0	0
	84	0	0	0	11	11
	85	0	0	0	21	21
	86	0	0	0	0	0
	87	0	0	0	0	0

Table 8: Distribution of Capital Financing for Water & Sewer, Peel, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	3.28	3.08	10.36	83.28
	78	7.66	3.65	1.55	87.14
	79	3.95	2.02	0.02	94.01
	80	13.60	5.98	0.00	80.42
	81	11.03	13.14	0.00	75.83
	82	14.30	10.76	0.00	74.94
	83	15.30	0.00	0.06	84.64
	84	8.67	0.00	0.00	91.33
	85	9.15	0.00	0.00	90.85
	86	3.58	0.00	0.00	96.42
	87	4.15	0.00	0.00	95.85
STORM SEWERS	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	0.00
	85	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00
WATER	77	(0.66)	6.55	18.44	75.66
	78	7.83	5.29	0.42	86.46
	79	21.00	6.36	2.57	70.07
	80	7.55	7.57	0.00	84.88
	81	6.45	5.59	0.09	87.87
	82	10.66	1.84	0.27	87.23
	83	9.69	0.00	0.00	90.31
	84	8.51	0.00	0.00	91.49
	85	10.04	0.00	0.17	89.79
	86	8.85	0.00	(0.10)	91.25
	87	12.57	0.00	0.00	87.43
POLLUTION CONTROL	77	0.00	0.00	0.00	100.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	100.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	100.00
	85	0.00	0.00	0.00	100.00
	86	0.00	0.00	0.00	0.00
	87	0.00	0.00	0.00	0.00

Table 9: Net Long Term Liabilities for Water and Sewers, Peel, 1980-1987

FY	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
	CURRENT YEAR THOUSAND DOLLARS			
80	21,131	0	14,208	326
81	19,422	0	13,241	0
82	44,362	0	16,380	0
83	41,878	0	16,255	0
84	51,443	0	18,300	0
85	54,001	0	17,284	0
86	48,078	0	15,489	0
87	42,113	0	13,685	0

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Peel, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	5,753		2
	78	6,388		0
	79	9,103		0
	80	9,242		0
	81	9,812		0
	82	10,133		0
	83	10,752		0
	84	11,340	0	0
	85	11,420	0	0
	86	11,983	0	0
	87	12,649	0	0
SEWER	77	5,902		4
	78	7,367		0
	79	9,771		0
	80	9,822		0
	81	10,241		0
	82	11,506		0
	83	12,545		0
	84	12,492	0	0
	85	12,962	0	0
	86	12,905	0	0
	87	13,943	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	8,387		4
	78	8,679		0
	79	11,294		0
	80	10,431		0
	81	9,812		0
	82	9,121		0
	83	9,158		0
	84	9,303	0	0
	85	9,042	0	0
	86	9,218	0	0
	87	9,384	0	0
SEWER	77	8,604		6
	78	10,010		0
	79	12,123		0
	80	11,085		0
	81	10,241		0
	82	10,356		0
	83	10,685		0
	84	10,248	0	0
	85	10,263	0	0
	86	9,927	0	0
	87	10,344	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Peel, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CURRENT YEAR THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	67,499	0
81	(6,058)	53,481	5,913
82	472	61,356	5,977
83	(5,883)	60,935	5,914
84	(6,054)	60,476	5,913
85	(5,824)	59,976	5,913
86	(98)	63,649	6,550
87	(29)	62,776	6,550
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	57,913	0
81	446	56,620	4,960
82	294	56,237	5,037
83	42	55,824	4,960
84	747	55,377	4,960
85	876	58,343	5,441
86	321	59,154	5,631
87	78	58,529	5,631
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Peel, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CONSTANT 1981 THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	76,184	0
81	(6,058)	53,481	5,913
82	425	55,226	5,380
83	(5,011)	51,904	5,037
84	(4,966)	49,611	4,851
85	(4,611)	47,487	4,682
86	(75)	48,961	5,039
87	(21)	46,570	4,859
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	65,365	0
81	446	56,620	4,960
82	265	50,618	4,534
83	36	47,550	4,225
84	613	45,428	4,069
85	694	46,194	4,308
86	247	45,503	4,332
87	58	43,419	4,177
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Peel, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Peel											
78	10,953	10,729	201			7	28	30	2,716	(2,184)	22,480
83	22,219	22,592	928					17	3,258	(5,673)	43,341
84	23,493	24,822	890				2	16	4,190	(7,602)	45,811
85	26,606	28,199	840					13	6,691	(11,537)	50,812
86	27,051	28,834	831					22	9,387	(12,774)	53,350
87	30,725	32,238	824			22	5	55	11,914	(20,765)	55,018

CITY OF
WINDSOR

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Windsor, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	2,540	2,785	5,325	1,807
78	0	4,426	4,867	9,293	1,672
79	0	5,415	4,161	9,577	2,588
80	0	9,599	2,484	12,084	1,736
81	0	10,241	484	10,726	1,215
82	0	3,634	2,266	5,900	1,296
83	0	2,426	2,719	5,144	1,009
84	203	1,597	3,787	5,383	1,080
85	237	1,927	3,440	5,366	1,466
86	338	2,642	1,986	4,628	1,512
87	1,625	3,796	2,804	6,600	3,026

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	3,702	4,060	7,762	2,634
78	0	6,013	6,613	12,626	2,272
79	0	6,719	5,163	11,882	3,210
80	0	10,834	2,804	13,638	1,960
81	0	10,241	484	10,726	1,215
82	0	3,271	2,040	5,311	1,167
83	0	2,066	2,316	4,382	859
84	166	1,310	3,106	4,416	886
85	187	1,526	2,723	4,249	1,161
86	260	2,033	1,528	3,560	1,163
87	1,206	2,816	2,080	4,896	2,244

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Windsor, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	70,217	0.00	36.17	39.66	75.83	25.74
78	71,038	0.00	62.30	68.52	130.82	23.54
79	72,497	0.00	74.70	57.40	132.10	35.69
80	74,200	0.00	129.37	33.48	162.85	23.40
81	76,484	0.00	133.90	6.33	140.23	15.89
82	76,485	0.00	47.52	29.63	77.14	16.95
83	76,938	0.00	31.53	35.34	66.86	13.11
84	76,333	2.66	20.92	49.61	70.52	14.15
85	76,180	3.10	25.29	45.15	70.44	19.25
86	76,369	4.42	34.60	26.00	60.61	19.80
87	76,620	21.21	49.54	36.59	86.14	39.49

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	70,217	0.00	52.73	57.82	110.54	37.52
78	71,038	0.00	84.65	93.09	177.74	31.98
79	72,497	0.00	92.68	71.22	163.90	44.28
80	74,200	0.00	146.01	37.79	183.80	26.41
81	76,484	0.00	133.90	6.33	140.23	15.89
82	76,485	0.00	42.77	26.67	69.44	15.25
83	76,938	0.00	26.86	30.10	56.95	11.17
84	76,333	2.18	17.16	40.70	57.85	11.61
85	76,180	2.46	20.03	35.75	55.77	15.24
86	76,369	3.40	26.62	20.00	46.62	15.23
87	76,620	15.73	36.75	27.15	63.90	29.29

Table 3: Municipal Revenue Fund Expenditures on Water & Sewers, Windsor, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	6,288	3,364	9,652	5,752
78	0	6,309	3,647	9,956	5,195
79	0	6,913	3,528	10,441	6,102
80	0	8,371	3,850	12,220	6,778
81	0	8,554	4,153	12,707	6,958
82	0	9,442	4,302	13,744	7,223
83	0	12,861	6,096	18,957	8,924
84	117	13,631	7,284	20,915	8,188
85	0	13,686	7,975	21,661	8,418
86	11	14,064	9,433	23,497	9,552
87	0	17,353	9,338	26,692	10,561
Annual Average Growth Rate		0.10684	0.10751	0.10707	0.06264

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	0	9,167	4,903	14,070	8,385
78	0	8,572	4,955	13,527	7,059
79	0	8,577	4,378	12,954	7,570
80	0	9,448	4,345	13,793	7,650
81	0	8,554	4,153	12,707	6,958
82	0	8,499	3,872	12,371	6,502
83	0	10,955	5,193	16,147	7,601
84	96	11,182	5,975	17,158	6,717
85	0	10,836	6,315	17,150	6,665
86	9	10,819	7,256	18,075	7,347
87	0	12,873	6,927	19,801	7,834
Annual Average Growth Rate		0.03454	0.03516	0.03476	-0.00677

Table 4: **Municipal Revenue Fund Expenditures per Household on Water & Sewers, Windsor, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	70,217	0.00	89.56	47.90	137.46	81.92
78	71,038	0.00	88.81	51.34	140.15	73.13
79	72,497	0.00	95.35	48.67	144.02	84.16
80	74,200	0.00	112.81	51.88	164.69	91.35
81	76,484	0.00	111.84	54.30	166.14	90.98
82	76,485	0.00	123.45	56.24	179.69	94.44
83	76,938	0.00	167.16	79.23	246.39	115.99
84	76,333	1.53	178.58	95.42	274.00	107.26
85	76,180	0.00	179.65	104.69	284.34	110.51
86	76,369	0.15	184.16	123.52	307.68	125.07
87	76,620	0.00	226.49	121.88	348.36	137.83
Annual Average Growth Rate	0.00876		0.09722	0.09788	0.09745	0.05341

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	70,217	0.00	130.55	69.83	200.38	119.42
78	71,038	0.00	120.67	69.75	190.42	99.37
79	72,497	0.00	118.30	60.38	178.69	104.42
80	74,200	0.00	127.33	58.56	185.89	103.10
81	76,484	0.00	111.84	54.30	166.14	90.98
82	76,485	0.00	111.12	50.62	161.74	85.01
83	76,938	0.00	142.39	67.49	209.88	98.80
84	76,333	1.25	146.50	78.28	224.78	87.99
85	76,180	0.00	142.24	82.89	225.13	87.50
86	76,369	0.11	141.66	95.01	236.68	96.21
87	76,620	0.00	168.02	90.41	258.43	102.25
Annual Average Growth Rate	0.00876		0.02555	0.02617	0.02577	-0.01540

Table 5: Object of Municipal Revenue Fund Expenditures, Windsor, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	1,082,354	2,801,284	1,166,989	1,126,867	0	110,838
	78	1,028,238	3,137,874	1,783,559	275,019	0	84,404
	79	1,037,843	3,333,339	1,767,706	678,840	0	94,988
	80	1,396,587	4,055,407	2,112,565	702,560	0	103,383
	81	1,577,136	4,147,613	2,250,198	479,649	0	99,478
	82	1,669,453	4,430,139	2,336,430	869,003	0	137,097
	83	1,841,883	7,625,607	2,471,546	735,464	0	186,508
	84	1,861,921	8,397,639	2,634,501	603,304	0	134,015
	85	1,990,046	8,139,718	2,696,145	728,475	0	131,302
	86	2,104,322	7,910,362	3,096,130	817,078	0	136,384
	87	2,221,563	8,375,153	4,860,156	1,751,483	0	145,044
STORM SEWERS	77	526,286	2,265,964	256,658	128,734	0	185,988
	78	594,633	2,449,889	146,187	281,097	0	175,083
	79	399,700	2,456,783	514,166	9,195	0	148,536
	80	433,884	2,757,114	474,877	0	0	183,960
	81	440,449	2,747,377	574,168	221,351	0	169,713
	82	323,958	2,699,812	987,933	173,559	0	116,400
	83	1,530,445	3,584,420	941,943	39,230	0	0
	84	1,018,394	4,810,198	1,069,607	385,794	0	0
	85	1,043,798	5,153,190	1,230,582	296,815	0	250,992
	86	1,174,546	5,475,259	1,059,684	1,415,774	0	307,520
	87	1,195,562	4,922,941	695,855	2,187,434	0	336,474
WATER	77	2,722,869	144,245	1,746,632	1,138,450	0	0
	78	2,936,043	138,321	1,262,246	858,617	0	0
	79	2,940,109	43,777	1,388,347	1,729,308	0	0
	80	3,207,743	38,939	2,039,320	1,482,159	10,000	0
	81	3,522,406	26,180	2,145,576	1,264,261	0	0
	82	3,985,342	0	2,381,295	856,667	0	0
	83	4,097,785	0	3,377,445	1,632,054	0	(183,500)
	84	4,616,937	0	2,338,928	1,416,611	0	(184,870)
	85	4,790,320	0	2,533,908	1,382,439	0	(288,170)
	86	5,129,156	0	2,517,835	2,207,232	0	(302,578)
	87	5,378,684	17,160	2,751,996	2,730,705	0	(317,707)
POLLUTION CONTROL	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	116,739	0	0
	85	0	0	0	0	0	0
	86	0	0	0	11,102	0	0
	87	0	0	0	0	0	0

Table 5: Object of Municipal Revenue Fund Expenditures, Windsor, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	1,577,776	4,083,504	1,701,150	1,642,663	0	161,571
	78	1,397,063	4,263,416	2,423,314	373,667	0	114,679
	79	1,287,646	4,135,656	2,193,184	842,233	0	117,851
	80	1,576,283	4,577,209	2,384,385	792,957	0	116,685
	81	1,577,136	4,147,613	2,250,198	479,649	0	99,478
	82	1,502,658	3,987,524	2,102,997	782,181	0	123,400
	83	1,568,895	6,495,406	2,105,235	626,460	0	158,865
	84	1,527,417	6,888,957	2,161,199	494,917	0	109,938
	85	1,575,650	6,444,749	2,134,715	576,781	0	103,960
	86	1,618,709	6,084,894	2,381,638	628,522	0	104,911
	87	1,648,044	6,213,022	3,605,457	1,299,320	0	107,599
STORM SEWERS	77	767,181	3,303,155	374,137	187,659	0	271,120
	78	807,925	3,328,654	198,624	381,925	0	237,885
	79	495,906	3,048,118	637,923	11,408	0	184,288
	80	489,711	3,111,867	535,979	0	0	207,630
	81	440,449	2,747,377	574,168	221,351	0	169,713
	82	291,591	2,430,074	889,229	156,219	0	104,770
	83	1,303,616	3,053,169	802,336	33,416	0	0
	84	835,434	3,946,020	877,446	316,484	0	0
	85	826,443	4,080,119	974,333	235,008	0	198,727
	86	903,497	4,211,738	815,142	1,089,057	0	236,554
	87	886,915	3,652,033	516,213	1,622,726	0	249,610
WATER	77	3,969,197	210,270	2,546,111	1,659,548	0	0
	78	3,989,189	187,936	1,715,008	1,166,599	0	0
	79	3,647,778	54,314	1,722,515	2,145,543	0	0
	80	3,620,477	43,949	2,301,716	1,672,866	11,287	0
	81	3,522,406	26,180	2,145,576	1,264,261	0	0
	82	3,587,167	0	2,143,380	771,077	0	0
	83	3,490,447	0	2,876,870	1,390,165	0	(156,303)
	84	3,787,479	0	1,918,727	1,162,109	0	(151,657)
	85	3,792,811	0	2,006,261	1,094,568	0	(228,163)
	86	3,945,505	0	1,936,796	1,697,871	0	(232,752)
	87	3,990,122	12,730	2,041,540	2,025,746	0	(235,688)
POLLUTION CONTROL	77	0	0	0	0	0	0
	78	0	0	0	0	0	0
	79	0	0	0	0	0	0
	80	0	0	0	0	0	0
	81	0	0	0	0	0	0
	82	0	0	0	0	0	0
	83	0	0	0	0	0	0
	84	0	0	0	95,766	0	0
	85	0	0	0	0	0	0
	86	0	0	0	8,540	0	0
	87	0	0	0	0	0	0

Table 6: Distribution of Municipal Revenue Fund Expenditures, Windsor, 1977-1987

		PERCENT					
	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	17.21	44.55	18.56	17.92	0.00	1.76
	78	16.30	49.74	28.27	4.36	0.00	1.34
	79	15.01	48.22	25.57	9.82	0.00	1.37
	80	16.68	48.45	25.24	8.39	0.00	1.24
	81	18.44	48.49	26.31	5.61	0.00	1.16
	82	17.68	46.92	24.74	9.20	0.00	1.45
	83	14.32	59.29	19.22	5.72	0.00	1.45
	84	13.66	61.61	19.33	4.43	0.00	0.98
	85	14.54	59.48	19.70	5.32	0.00	0.96
	86	14.96	56.24	22.01	5.81	0.00	0.97
	87	12.80	48.26	28.01	10.09	0.00	0.84
STORM SEWERS	77	15.65	67.37	7.63	3.83	0.00	5.53
	78	16.31	67.18	4.01	7.71	0.00	4.80
	79	11.33	69.63	14.57	0.26	0.00	4.21
	80	11.27	71.62	12.33	0.00	0.00	4.78
	81	10.61	66.15	13.83	5.33	0.00	4.09
	82	7.53	62.76	22.97	4.03	0.00	2.71
	83	25.11	58.80	15.45	0.64	0.00	0.00
	84	13.98	66.04	14.68	5.30	0.00	0.00
	85	13.09	64.61	15.43	3.72	0.00	3.15
	86	12.45	58.05	11.23	15.01	0.00	3.26
	87	12.80	52.72	7.45	23.42	0.00	3.60
WATER	77	47.34	2.51	30.36	19.79	0.00	0.00
	78	56.51	2.66	24.30	16.53	0.00	0.00
	79	48.19	0.72	22.75	28.34	0.00	0.00
	80	47.32	0.57	30.09	21.87	0.15	0.00
	81	50.62	0.38	30.83	18.17	0.00	0.00
	82	55.17	0.00	32.97	11.86	0.00	0.00
	83	45.92	0.00	37.85	18.29	0.00	(2.06)
	84	56.39	0.00	28.57	17.30	0.00	(2.26)
	85	56.90	0.00	30.10	16.42	0.00	(3.42)
	86	53.70	0.00	26.36	23.11	0.00	(3.17)
	87	50.93	0.16	26.06	25.86	0.00	(3.01)
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	100.00	0.00	0.00
	85	0.00	0.00	0.00	0.00	0.00	0.00
	86	0.00	0.00	0.00	100.00	0.00	0.00
	87	0.00	0.00	0.00	0.00	0.00	0.00

Table 7: Sources of Capital Financing for Water and Sewers, Windsor, 1977-1987

		CURRENT YEAR THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	80	0	0	2,460	2,540
	78	270	24	0	4,132	4,426
	79	655	0	0	4,761	5,415
	80	1,971	698	0	6,930	9,599
	81	596	2,809	0	6,836	10,241
	82	347	588	0	2,699	3,634
	83	359	28	0	2,039	2,426
	84	152	0	0	1,445	1,597
	85	234	0	0	1,692	1,927
	86	342	0	0	2,301	2,642
	87	1,350	0	0	2,446	3,796
STORM SEWERS	77	755	167	0	1,863	2,785
	78	830	35	0	4,002	4,867
	79	921	372	0	2,868	4,161
	80	307	67	0	2,110	2,484
	81	769	0	0	(285)	484
	82	472	11	0	1,783	2,266
	83	872	0	0	1,847	2,719
	84	914	0	0	2,873	3,787
	85	811	0	0	2,629	3,440
	86	362	0	0	1,624	1,986
	87	313	0	0	2,490	2,804
WATER	77	0	0	0	1,807	1,807
	78	0	0	0	1,672	1,672
	79	0	0	0	2,588	2,588
	80	31	0	0	1,706	1,736
	81	4	0	0	1,211	1,215
	82	1	0	0	1,295	1,296
	83	0	0	0	1,009	1,009
	84	0	0	0	1,080	1,080
	85	0	0	0	1,466	1,466
	86	0	0	0	1,512	1,512
	87	0	0	0	3,026	3,026
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	203	203
	85	0	0	0	237	237
	86	0	0	0	338	338
	87	1,588	0	0	37	1,625

Table 7: Sources of Capital Financing for Water and Sewers, Windsor, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	116	0	0	3,586	3,702
	78	367	32	0	5,614	6,013
	79	812	0	0	5,907	6,719
	80	2,225	788	0	7,822	10,834
	81	596	2,809	0	6,836	10,241
	82	313	529	0	2,430	3,271
	83	306	24	0	1,736	2,066
	84	125	0	0	1,185	1,310
	85	186	0	0	1,340	1,526
	86	263	0	0	1,770	2,033
	87	1,002	0	0	1,815	2,816
STORM SEWERS	77	1,100	244	0	2,716	4,060
	78	1,128	48	0	5,438	6,613
	79	1,143	462	0	3,559	5,163
	80	346	76	0	2,382	2,804
	81	769	0	0	(285)	484
	82	425	10	0	1,605	2,040
	83	743	0	0	1,573	2,316
	84	750	0	0	2,357	3,106
	85	642	0	0	2,081	2,723
	86	279	0	0	1,249	1,528
	87	232	0	0	1,848	2,080
WATER	77	0	0	0	2,634	2,634
	78	0	0	0	2,272	2,272
	79	0	0	0	3,210	3,210
	80	35	0	0	1,925	1,960
	81	4	0	0	1,211	1,215
	82	1	0	0	1,166	1,167
	83	0	0	0	859	859
	84	0	0	0	886	886
	85	0	0	0	1,161	1,161
	86	0	0	0	1,163	1,163
	87	0	0	0	2,244	2,244
POLLUTION CONTROL	77	0	0	0	0	0
	78	0	0	0	0	0
	79	0	0	0	0	0
	80	0	0	0	0	0
	81	0	0	0	0	0
	82	0	0	0	0	0
	83	0	0	0	0	0
	84	0	0	0	166	166
	85	0	0	0	187	187
	86	0	0	0	260	260
	87	1,178	0	0	28	1,206

Table 8: Distribution of Capital Financing for Water & Sewer, Windsor, 1977-1987

		PERCENT			
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	3.14	0.00	0.00	96.86
	78	6.10	0.53	0.00	93.36
	79	12.09	0.00	0.00	87.91
	80	20.53	7.27	0.00	72.19
	81	5.82	27.43	0.00	66.75
	82	9.56	16.17	0.00	74.27
	83	14.80	1.16	0.00	84.04
	84	9.53	0.00	0.00	90.47
	85	12.17	0.00	0.00	87.83
	86	12.93	0.00	0.00	87.07
	87	35.57	0.00	0.00	64.43
STORM SEWERS	77	27.10	6.00	0.00	66.90
	78	17.05	0.72	0.00	82.23
	79	22.13	8.94	0.00	68.93
	80	12.35	2.72	0.00	84.93
	81	158.87	0.00	0.00	-58.87
	82	20.84	0.48	0.00	78.68
	83	32.07	0.00	0.00	67.93
	84	24.14	0.00	0.00	75.86
	85	23.58	0.00	0.00	76.42
	86	18.23	0.00	0.00	81.77
	87	11.17	0.00	0.00	88.83
WATER	77	0.00	0.00	0.00	100.00
	78	0.00	0.00	0.00	100.00
	79	0.00	0.00	0.00	100.00
	80	1.76	0.00	0.00	98.24
	81	0.36	0.00	0.00	99.64
	82	0.05	0.00	0.00	99.95
	83	0.00	0.00	0.00	100.00
	84	0.00	0.00	0.00	100.00
	85	0.00	0.00	0.00	100.00
	86	0.00	0.00	0.00	100.00
	87	0.00	0.00	0.00	100.00
POLLUTION CONTROL	77	0.00	0.00	0.00	0.00
	78	0.00	0.00	0.00	0.00
	79	0.00	0.00	0.00	0.00
	80	0.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	0.00
	82	0.00	0.00	0.00	0.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	100.00
	85	0.00	0.00	0.00	100.00
	86	0.00	0.00	0.00	100.00
	87	97.70	0.00	0.00	2.30

Table 9: Net Long Term Liabilities for Water and Sewers, Windsor, 1980-1987

FY	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
	CURRENT YEAR THOUSAND DOLLARS			
80	27,292	20,205	111	0
81	26,538	19,129	92	0
82	34,654	19,668	78	0
83	35,721	22,546	68	0
84	31,443	22,247	51	0
85	28,227	21,242	34	0
86	25,818	18,177	17	0
87	24,550	16,192	0	0

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Windsor, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0
SEWER	77	0		0
	78	0		0
	79	0		0
	80	0		0
	81	0		0
	82	0		0
	83	0		0
	84	0	0	0
	85	0	0	0
	86	0	0	0
	87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Windsor, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Windsor, 1980-1987

	CONSTANT 1981 THOUSAND DOLLARS		
FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, Windsor, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Windsor											
78	5,089							448	230	7,970	13,736
83	7,005					542	21	576	507	16,823	25,474
84	7,809					140		624	770	17,355	26,697
85	8,207					219	5	954	740	17,547	27,672
86	8,591					232		785	1,065	17,934	28,609
87	9,050					415	3	759	1,552	18,803	30,583

SUMMARY OF CASE STUDY MUNICIPALITIES

Table 1: Municipal Capital Fund Expenditures on Water & Sewers, Total Case Studies, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	6	44,446	4,741	49,187	46,134
78	1	57,386	13,043	70,429	42,380
79	11	47,888	10,155	58,043	37,124
80	8	41,688	3,822	45,510	23,660
81	14	51,566	1,467	53,033	24,902
82	4	64,584	3,982	68,566	29,392
83	0	61,807	6,651	68,458	28,196
84	217	46,661	11,375	58,036	26,388
85	263	40,095	8,684	48,779	23,234
86	338	45,559	7,673	53,231	34,390
87	1,645	50,619	6,259	56,878	47,510

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	8	64,790	6,911	71,701	67,250
78	2	77,971	17,721	95,692	57,582
79	14	59,415	12,599	72,014	46,060
80	9	47,052	4,314	51,365	26,704
81	14	51,566	1,467	53,033	24,902
82	3	58,132	3,584	61,716	26,455
83	0	52,647	5,665	58,311	24,017
84	178	38,278	9,331	47,609	21,648
85	208	31,746	6,875	38,621	18,396
86	260	35,045	5,902	40,947	26,454
87	1,220	37,551	4,643	42,194	35,245

Table 2: **Municipal Capital Fund Expenditures per Household on Water & Sewers, Total Case Studies, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1,136,913	2	180	53	233	165
78	1,164,016	1	225	123	347	191
79	1,188,902	5	214	98	311	184
80	1,214,909	4	289	53	342	134
81	1,234,163	6	387	30	417	241
82	1,258,773	0	387	40	427	286
83	1,267,011	0	350	967	1,317	177
84	1,282,493	3	194	199	393	154
85	1,296,351	3	183	78	261	133
86	1,309,142	4	328	61	390	327
87	1,326,573	29	325	58	383	321

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1,136,913	3	263	77	340	240
78	1,164,016	1	305	167	472	259
79	1,188,902	6	265	121	386	229
80	1,214,909	4	326	60	386	151
81	1,234,163	6	387	30	417	241
82	1,258,773	0	348	36	385	258
83	1,267,011	0	298	824	1,122	151
84	1,282,493	2	159	163	322	127
85	1,296,351	3	145	62	207	105
86	1,309,142	3	253	47	300	252
87	1,326,573	22	241	43	284	238

Table 3: **Municipal Revenue Fund Expenditures on Water & Sewers, Total Case Studies, 1977-1987**

CURRENT YEAR THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	666	63,498	6,402	69,900	72,587
78	1,095	74,589	7,119	81,708	76,965
79	1,140	91,027	7,098	98,125	84,510
80	1,500	100,413	7,567	107,980	93,980
81	1,510	117,484	8,105	125,590	101,964
82	1,359	128,075	7,749	135,824	113,335
83	695	140,075	9,384	149,459	125,953
84	928	151,411	10,861	162,273	126,391
85	1,254	167,717	11,792	179,509	148,017
86	1,400	167,722	13,563	181,285	166,298
87	1,650	183,680	13,615	197,296	155,816
Annual Average Growth Rate	0.09497	0.11207	0.07838	0.10934	0.07938

CONSTANT 1981 THOUSAND DOLLARS

FY	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	971	92,563	9,332	101,895	105,812
78	1,488	101,344	9,672	111,017	104,572
79	1,414	112,937	8,806	121,743	104,851
80	1,693	113,333	8,541	121,873	106,073
81	1,510	117,484	8,105	125,590	101,964
82	1,223	115,279	6,975	122,254	102,012
83	592	119,314	7,993	127,308	107,285
84	761	124,209	8,910	133,119	103,684
85	993	132,793	9,337	142,129	117,195
86	1,077	129,017	10,433	139,450	127,922
87	1,224	136,261	10,100	146,362	115,590
Annual Average Growth Rate	0.02344	0.03943	0.00794	0.03688	0.00888

Table 4: **Municipal Revenue Fund Expenditures per Household on Water & Sewers, Total Case Studies, 1977-1987**

CURRENT YEAR DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1,136,913	64	351	69	420	442
78	1,164,016	66	381	74	455	458
79	1,188,902	69	414	73	487	501
80	1,214,909	74	445	78	523	518
81	1,234,163	87	498	80	578	562
82	1,258,773	73	539	79	618	618
83	1,267,011	78	645	102	746	686
84	1,282,493	75	662	121	783	672
85	1,296,351	101	722	129	852	754
86	1,309,142	90	731	151	883	836
87	1,326,573	104	827	150	976	822
Annual Average Growth Rate	0.01555	0.04991	0.08955	0.07995	0.08802	0.06390

CONSTANT 1981 DOLLARS

FY	HOUSEHOLDS	POLLUTION CONTROL	SANITARY SEWERS	STORM SEWERS	TOTAL SEWERS	WATER
77	1,136,913	93	511	101	612	645
78	1,164,016	90	518	101	619	622
79	1,188,902	85	514	90	604	622
80	1,214,909	84	503	88	590	584
81	1,234,163	87	498	80	578	562
82	1,258,773	66	485	71	556	556
83	1,267,011	66	549	87	636	584
84	1,282,493	61	543	99	642	551
85	1,296,351	80	572	102	674	597
86	1,309,142	69	562	116	679	643
87	1,326,573	77	613	111	724	610
Annual Average Growth Rate	0.01555	-0.01867	0.01838	0.00941	0.01695	-0.00560

Table 5: Object of Municipal Revenue Fund Expenditures, Total Case Studies, 1977-1987

CURRENT YEAR THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	14,732	23,415	20,051	4,557	0	743
	78	16,036	28,862	24,234	4,816	0	641
	79	18,001	30,891	27,845	13,871	0	419
	80	20,261	33,137	32,181	14,408	0	425
	81	23,380	35,102	34,586	22,431	0	1,986
	82	28,306	37,954	40,913	19,016	0	1,887
	83	31,416	46,786	42,861	18,069	0	942
	84	33,835	47,677	44,563	22,259	0	3,077
	85	35,517	56,030	48,745	24,094	0	3,331
	86	37,948	52,362	50,063	23,926	0	3,423
	87	41,333	52,714	55,004	30,694	0	3,936
STORM SEWERS	77	581	3,076	435	2,124	0	186
	78	630	3,678	350	2,287	0	175
	79	431	3,757	726	2,035	0	149
	80	480	4,071	582	2,250	0	184
	81	485	4,029	733	2,689	0	170
	82	640	3,944	1,029	2,019	0	116
	83	1,872	4,710	866	1,832	0	103
	84	1,362	5,710	1,100	2,646	0	43
	85	1,399	6,064	1,369	2,784	0	177
	86	1,535	6,393	1,063	4,193	0	379
	87	1,292	5,655	912	5,346	0	410
WATER	77	15,476	24,699	23,900	7,179	0	1,332
	78	16,420	27,430	23,493	8,365	0	1,258
	79	17,310	27,542	29,630	8,487	0	1,542
	80	19,832	28,993	33,087	10,361	10	1,698
	81	21,846	29,242	37,802	11,835	0	1,240
	82	25,940	30,442	40,969	13,768	0	2,216
	83	29,332	31,265	42,602	17,555	0	5,198
	84	29,536	30,860	45,165	17,208	0	3,620
	85	29,863	34,076	47,260	32,786	0	4,032
	86	32,697	29,245	50,449	49,765	0	4,142
	87	34,766	26,316	53,422	37,389	0	3,922
POLLUTION CONTROL	77	468	56	104	22	14	2
	78	515	59	119	20	9	372
	79	555	66	136	0	9	373
	80	617	65	138	7	9	665
	81	911	130	603	49	0	(183)
	82	1,008	133	462	24	0	(268)
	83	1,139	65	257	18	0	(783)
	84	1,255	57	462	167	15	(1,028)
	85	1,246	115	443	535	33	(1,117)
	86	1,425	112	419	506	15	(1,077)
	87	1,455	108	589	697	24	(1,223)

Table 5: Object of Municipal Revenue Fund Expenditures, Total Case Studies, 1977-1987

CONSTANT 1981 THOUSAND DOLLARS

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	21,476	34,133	29,229	6,643	0	1,083
	78	21,788	39,215	32,927	6,544	0	871
	79	22,333	38,327	34,547	17,210	0	520
	80	22,868	37,401	36,321	16,262	0	480
	81	23,380	35,102	34,586	22,431	0	1,986
	82	25,478	34,162	36,825	17,116	0	1,699
	83	26,760	39,852	36,509	15,391	0	803
	84	27,756	39,112	36,557	18,260	0	2,524
	85	28,121	44,363	38,595	19,077	0	2,638
	86	29,191	40,278	38,510	18,405	0	2,633
	87	30,662	39,105	40,804	22,770	0	2,920
STORM SEWERS	77	846	4,484	634	3,097	0	271
	78	855	4,997	475	3,107	0	238
	79	534	4,662	901	2,525	0	184
	80	542	4,595	657	2,539	0	208
	81	485	4,029	733	2,689	0	170
	82	576	3,550	926	1,817	0	105
	83	1,595	4,012	738	1,561	0	88
	84	1,118	4,684	902	2,170	0	36
	85	1,108	4,801	1,084	2,204	0	140
	86	1,181	4,918	818	3,225	0	291
	87	958	4,195	677	3,966	0	304
WATER	77	22,560	36,004	34,840	10,466	0	1,942
	78	22,310	37,269	31,920	11,365	0	1,709
	79	21,477	34,171	36,761	10,530	0	1,913
	80	22,383	32,724	37,344	11,694	11	1,916
	81	21,846	29,242	37,802	11,835	0	1,240
	82	23,349	27,400	36,876	12,393	0	1,995
	83	24,985	26,632	36,288	14,953	0	4,428
	84	24,230	25,316	37,051	14,117	0	2,970
	85	23,645	26,980	37,419	25,959	0	3,192
	86	25,151	22,496	38,807	38,281	0	3,186
	87	25,791	19,523	39,630	27,737	0	2,910
POLLUTION CONTROL	77	682	81	152	32	20	3
	78	700	81	162	27	12	506
	79	689	82	169	0	11	463
	80	696	73	156	8	10	751
	81	911	130	603	49	0	(183)
	82	907	120	416	21	0	(242)
	83	970	56	219	15	0	(667)
	84	1,030	47	379	137	12	(843)
	85	986	91	351	423	26	(885)
	86	1,096	86	323	389	12	(829)
	87	1,079	80	437	517	18	(907)

Table 6: Distribution of Municipal Revenue Fund Expenditures, Total Case Studies, 1977-1987

PERCENT

	FY	SALARIES, WAGES AND BENEFITS	NET LONG TERM DEBT CHARGES	MATERIALS, SVCS, RENTS & FIN EXPENSE	TRANSFERS TO OWN FUNDS	OTHER TRANSFERS	INTER-FUNC TRANSFERS
SANITARY SEWERS	77	23.20	36.87	31.58	7.18	0.00	1.17
	78	21.50	38.70	32.49	6.46	0.00	0.86
	79	19.78	33.94	30.59	15.24	0.00	0.46
	80	20.18	33.00	32.05	14.35	0.00	0.42
	81	19.90	29.88	29.44	19.09	0.00	1.69
	82	22.10	29.63	31.94	14.85	0.00	1.47
	83	22.43	33.40	30.60	12.90	0.00	0.67
	84	22.35	31.49	29.43	14.70	0.00	2.03
	85	21.18	33.41	29.06	14.37	0.00	1.99
	86	22.63	31.22	29.85	14.27	0.00	2.04
	87	22.50	28.70	29.95	16.71	0.00	2.14
STORM SEWERS	77	9.07	48.05	6.80	33.18	0.00	2.91
	78	8.84	51.66	4.91	32.13	0.00	2.46
	79	6.07	52.94	10.23	28.67	0.00	2.09
	80	6.34	53.80	7.69	29.73	0.00	2.43
	81	5.98	49.71	9.04	33.17	0.00	2.09
	82	8.27	50.89	13.28	26.06	0.00	1.50
	83	19.95	50.19	9.23	19.52	0.00	1.10
	84	12.54	52.57	10.12	24.36	0.00	0.40
	85	11.86	51.42	11.61	23.61	0.00	1.50
	86	11.32	47.14	7.84	30.91	0.00	2.79
	87	9.49	41.53	6.70	39.27	0.00	3.01
WATER	77	21.32	34.03	32.93	9.89	0.00	1.84
	78	21.33	35.64	30.52	10.87	0.00	1.63
	79	20.48	32.59	35.06	10.04	0.00	1.82
	80	21.10	30.85	35.21	11.02	0.01	1.81
	81	21.43	28.68	37.07	11.61	0.00	1.22
	82	22.89	26.86	36.15	12.15	0.00	1.96
	83	23.29	24.82	33.82	13.94	0.00	4.13
	84	23.37	24.42	35.73	13.62	0.00	2.86
	85	20.18	23.02	31.93	22.15	0.00	2.72
	86	19.66	17.59	30.34	29.92	0.00	2.49
	87	22.31	16.89	34.29	24.00	0.00	2.52
POLLUTION CONTROL	77	70.29	8.37	15.62	3.29	2.10	0.33
	78	47.06	5.43	10.89	1.82	0.82	33.98
	79	48.71	5.80	11.96	0.00	0.79	32.73
	80	41.12	4.30	9.20	0.45	0.60	44.34
	81	60.32	8.61	39.92	3.23	0.00	(12.09)
	82	74.17	9.81	34.04	1.75	0.00	(19.76)
	83	163.72	9.38	36.97	2.58	0.00	(112.65)
	84	135.23	6.14	49.74	18.03	1.62	(110.75)
	85	99.35	9.14	35.34	42.64	2.63	(89.11)
	86	101.78	7.99	29.96	36.16	1.07	(76.96)
	87	88.15	6.54	35.71	42.24	1.45	(74.10)

Table 7: Sources of Capital Financing for Water and Sewers, Total Case Studies, 1977-1987

	FY	CURRENT YEAR THOUSAND DOLLARS ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	6,119	7,518	263	30,545	44,446
	78	7,351	7,589	71	42,376	57,386
	79	6,553	4,895	2	36,439	47,888
	80	6,467	2,797	3	32,421	41,688
	81	10,137	6,003	28	35,398	51,566
	82	11,215	3,639	121	49,610	64,584
	83	7,454	355	14	53,984	61,807
	84	6,014	1,070	0	39,578	46,661
	85	4,665	0	0	35,430	40,095
	86	2,233	0	51	43,275	45,559
	87	5,297	0	8	45,314	50,619
STORM SEWERS	77	755	167	0	3,819	4,741
	78	830	35	0	12,178	13,043
	79	5,218	372	0	4,565	10,155
	80	1,142	67	0	2,612	3,822
	81	1,319	0	0	147	1,467
	82	523	11	0	3,448	3,982
	83	2,955	58	0	3,638	6,651
	84	2,876	0	0	8,499	11,375
	85	1,176	0	0	7,508	8,684
	86	1,262	0	0	6,411	7,673
	87	1,407	0	0	4,852	6,259
WATER	77	7,629	2,772	547	35,187	46,134
	78	5,910	2,566	42	33,862	42,380
	79	7,445	2,195	299	27,185	37,124
	80	1,212	898	0	21,550	23,660
	81	6,035	752	49	18,066	24,902
	82	8,261	210	252	20,668	29,392
	83	4,509	0	59	23,628	28,196
	84	2,373	6	0	24,010	26,388
	85	2,642	0	18	20,574	23,234
	86	3,399	0	(18)	31,010	34,390
	87	6,156	0	158	41,196	47,510
POLLUTION CONTROL	77	0	5	0	1	6
	78	0	0	0	1	1
	79	11	0	0	0	11
	80	8	0	0	0	8
	81	0	0	0	14	14
	82	0	0	0	4	4
	83	0	0	0	0	0
	84	0	0	0	217	217
	85	0	0	0	263	263
	86	0	0	0	338	338
	87	1,588	0	0	57	1,645

Table 7: Sources of Capital Financing for Water and Sewers, Total Case Studies, 1977-1987

		CONSTANT 1981 THOUSAND DOLLARS				
	FY	ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES	TOTAL SOURCES
SANITARY SEWERS	77	8,920	10,960	383	44,526	64,790
	78	9,987	10,311	96	57,576	77,971
	79	8,130	6,073	2	45,210	59,415
	80	7,300	3,156	3	36,593	47,052
	81	10,137	6,003	28	35,398	51,566
	82	10,094	3,275	109	44,653	58,132
	83	6,349	302	12	45,983	52,647
	84	4,933	878	0	32,467	38,278
	85	3,694	0	0	28,052	31,746
	86	1,718	0	39	33,288	35,045
	87	3,930	0	6	33,616	37,551
STORM SEWERS	77	1,100	244	0	5,567	6,911
	78	1,128	48	0	16,546	17,721
	79	6,473	462	0	5,664	12,599
	80	1,289	76	0	2,948	4,314
	81	1,319	0	0	147	1,467
	82	471	10	0	3,103	3,584
	83	2,517	49	0	3,099	5,665
	84	2,359	0	0	6,972	9,331
	85	931	0	0	5,945	6,875
	86	971	0	0	4,931	5,902
	87	1,044	0	0	3,600	4,643
WATER	77	11,120	4,041	797	51,293	67,250
	78	8,029	3,487	58	46,008	57,582
	79	9,237	2,723	371	33,728	46,060
	80	1,368	1,013	0	24,323	26,704
	81	6,035	752	49	18,066	24,902
	82	7,436	189	227	18,603	26,455
	83	3,841	0	50	20,126	24,017
	84	1,946	5	0	19,696	21,648
	85	2,092	0	15	16,290	18,396
	86	2,614	0	(14)	23,854	26,454
	87	4,567	0	117	30,561	35,245
POLLUTION CONTROL	77	0	7	0	1	8
	78	0	0	0	2	2
	79	14	0	0	0	14
	80	9	0	0	0	9
	81	0	0	0	14	14
	82	0	0	0	3	3
	83	0	0	0	0	0
	84	0	0	0	178	178
	85	0	0	0	208	208
	86	0	0	0	260	260
	87	1,178	0	0	42	1,220

Table 8: Distribution of Capital Financing for Water & Sewer, Total Case Studies, 1977-1987

	FY	PERCENT ONTARIO GRANTS	CANADA GRANTS	OTHER MUNIC GRANTS	OWN SOURCES
SANITARY SEWERS	77	13.77	16.92	0.59	68.72
	78	12.81	13.22	0.12	73.84
	79	13.68	10.22	0.00	76.09
	80	15.51	6.71	0.01	77.77
	81	19.66	11.64	0.05	68.65
	82	17.36	5.63	0.19	76.81
	83	12.06	0.57	0.02	87.34
	84	12.89	2.29	0.00	84.82
	85	11.64	0.00	0.00	88.36
	86	4.90	0.00	0.11	94.99
	87	10.47	0.00	0.01	89.52
STORM SEWERS	77	15.92	3.52	0.00	80.55
	78	6.36	0.27	0.00	93.37
	79	51.38	3.66	0.00	44.95
	80	29.88	1.77	0.00	68.35
	81	89.96	0.00	0.00	10.04
	82	13.13	0.27	0.00	86.59
	83	44.43	0.87	0.00	54.70
	84	25.28	0.00	0.00	74.72
	85	13.54	0.00	0.00	86.46
	86	16.45	0.00	0.00	83.55
	87	22.48	0.00	0.00	77.52
WATER	77	16.54	6.01	1.18	76.27
	78	13.94	6.06	0.10	79.90
	79	20.05	5.91	0.81	73.23
	80	5.12	3.79	0.00	91.08
	81	24.23	3.02	0.20	72.55
	82	28.11	0.71	0.86	70.32
	83	15.99	0.00	0.21	83.80
	84	8.99	0.02	0.00	90.99
	85	11.37	0.00	0.08	88.55
	86	9.88	0.00	(0.05)	90.17
	87	12.96	0.00	0.33	86.71
POLLUTION CONTROL	77	0.00	87.03	0.00	12.97
	78	0.00	0.00	0.00	100.00
	79	100.00	0.00	0.00	0.00
	80	100.00	0.00	0.00	0.00
	81	0.00	0.00	0.00	100.00
	82	0.00	0.00	0.00	100.00
	83	0.00	0.00	0.00	0.00
	84	0.00	0.00	0.00	100.00
	85	0.00	0.00	0.00	100.00
	86	0.00	0.00	0.00	100.00
	87	96.52	0.00	0.00	3.48

Table 9: Net Long Term Liabilities for Water and Sewers, Total Case Studies, 1980-1987

FY	SANITARY SEWERS	STORM SEWERS	WATER	POLLUTION CONTROL
	CURRENT YEAR THOUSAND DOLLARS			
80	240,199	27,862	159,385	6,404
81	236,713	26,233	153,938	5,620
82	267,027	26,191	148,815	5,137
83	255,552	28,464	135,620	264
84	252,315	27,680	124,664	226
85	239,094	26,178	111,332	186
86	230,143	22,617	97,433	142
87	219,339	20,240	83,312	94

Table 10A: Analysis of MOE Projects - Municipal Revenue Fund Expenditures, Total Case Studies, 1977-1987

	FY	PROV'L PROJECTS SERVICE CHARGES	PROV'L PROJECTS FRONTAGE & CONNECTION CHARGES	JOINT PROJECTS OPERATING CHARGES
		CURRENT YEAR THOUSAND DOLLARS		
WATER	77	5,754	0	2
	78	6,390	0	0
	79	9,103	0	0
	80	9,242	0	0
	81	9,812	0	0
	82	10,133	0	0
	83	10,752	0	0
	84	11,340	0	39
	85	11,420	0	0
	86	11,983	0	0
	87	12,649	0	0
SEWER	77	7,167	0	4
	78	7,769	0	0
	79	11,547	0	0
	80	11,765	0	0
	81	12,357	0	0
	82	11,674	0	0
	83	15,366	0	29
	84	15,165	0	0
	85	16,364	0	0
	86	15,730	0	0
	87	16,374	0	0
		CONSTANT 1981 THOUSAND DOLLARS		
WATER	77	8,388	0	4
	78	8,682	0	0
	79	11,294	0	0
	80	10,431	0	0
	81	9,812	0	0
	82	9,121	0	0
	83	9,158	0	0
	84	9,303	0	32
	85	9,042	0	0
	86	9,218	0	0
	87	9,384	0	0
SEWER	77	10,447	0	6
	78	10,555	0	0
	79	14,326	0	0
	80	13,279	0	0
	81	12,357	0	0
	82	10,508	0	0
	83	13,089	0	25
	84	12,440	0	0
	85	12,956	0	0
	86	12,100	0	0
	87	12,147	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Total Case Studies, 1980-1987

FY	CURRENT YEAR THOUSAND DOLLARS ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
WATER - Municipal Only			
80	0	67,499	0
81	(6,058)	53,481	5,913
82	472	61,356	5,977
83	(5,883)	60,935	5,914
84	(6,054)	60,476	5,913
85	(5,824)	59,976	5,913
86	(98)	63,649	6,550
87	(29)	62,776	6,550
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	(1,049)	63,522	0
81	(905)	63,924	5,854
82	(1,373)	63,322	5,794
83	(1,950)	62,949	5,488
84	(1,540)	62,419	5,687
85	(1,593)	65,331	6,163
86	511	64,334	6,155
87	5,221	58,529	6,154
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 10B: Analysis of MOE Projects - Municipal Capital Fund Expenditures, Total Case Studies, 1980-1987

FY	ACCUMULATED SURPLUS (DEFICIT)	TOTAL OUTSTANDING CAPITAL OBLIGATIONS	DEBT CHARGES
	CONSTANT 1981 THOUSAND DOLLARS		
WATER - Municipal Only			
80	0	76,184	0
81	(6,058)	53,481	5,913
82	425	55,226	5,380
83	(5,011)	51,904	5,037
84	(4,966)	49,611	4,851
85	(4,611)	47,487	4,682
86	(75)	48,961	5,039
87	(21)	46,570	4,859
WATER - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
SEWERS - Municipal Only			
80	(1,184)	71,695	0
81	(905)	63,924	5,854
82	(1,236)	56,995	5,215
83	(1,661)	53,619	4,675
84	(1,263)	51,205	4,665
85	(1,261)	51,726	4,880
86	393	49,488	4,734
87	3,873	43,419	4,565
SEWERS - Share of Integrated Projects			
80	0	0	0
81	0	0	0
82	0	0	0
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Summary of All Municipalities											
78	51,625	27,182	43,324	206	2	1,196	28	1,193	9,464	59,343	193,575
83	80,879	55,632	114,116	103	2	2,684	559	1,212	15,959	42,878	314,024
84	89,514	58,150	124,579	85	2	2,364	630	2,596	17,866	32,417	328,200
85	97,219	63,746	139,313	41	2	2,036	5	2,995	22,242	26,447	354,047
86	102,297	66,669	7,262	27	.006	2,575	0	2,713	27,911	151,049	360,502
87	117,596	68,924	156,672	8	.9	2,972	8	3,776	34,511	(18,349)	366,119
Toronto											
78	23,247	4,957	42,975		2	1,115		589	5,660	53,954	132,509
83	32,004	11,259	108,816		2	2,093	444	585	10,754	41,579	207,535
84	39,731	13,125	118,926		2	1,983	628	762	12,403	31,710	219,269
85	42,764	14,309	133,296		2	1,703		799	14,198	31,653	238,724
86	46,370	15,250	807		0.006	2,160		546	16,455	159,051	240,640
87	55,726	12,130	149,839		0.9	2,393		1,008	19,967	332	241,396
Hamilton - Wentworth											
78	11,566	11,132	30	206		75			873	(917)	22,963
83	18,307	21,075	3,027	103		49	94		1,339	(9,787)	34,205
84	17,069	19,314	3,261	85		241		1,160	343	(8,804)	32,668
85	18,146	20,323	3,499	41		114		1,229	430	(11,107)	32,675
86	18,642	21,584	3,735	27		182		1,359	832	(12,799)	33,562
87	23,260	23,360	3,984	8		142		1,954	818	(16,229)	34,314

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Peel											
78	10,953	10,729	201			7	28	30	2,716	(2,184)	22,480
83	22,219	22,592	928					17	3,258	(5,673)	43,341
84	23,493	24,822	890				2	16	4,190	(7,602)	45,811
85	26,606	28,199	840					13	6,691	(11,537)	50,812
86	27,051	28,834	831					22	9,387	(12,774)	53,350
87	30,725	32,238	824			22	5	55	11,914	(20,765)	55,018
Muskoka											
78	577	327	119					27	79	498	1,627
83	1,001	638	1,346					34	78	(16)	3,081
84	1,056	810	1,500					34	134	(158)	3,377
85	1,127	833	1,679						159	(146)	3,651
86	1,254	911	1,889						142	(347)	3,849
87	1,381	1,077	2,025						230	(377)	4,336
Windsor											
78	5,089							448	230	7,970	13,736
83	7,005					542	21	576	507	16,823	25,474
84	7,809					140		624	770	17,355	26,697
85	8,207					219	5	954	740	17,547	27,672
86	8,591					232		785	1,065	17,934	28,609
87	9,050					415	3	759	1,552	18,803	30,583

Table 11: Sources of Revenue Fund Revenues for Water & Sewers, 1978 and 1983-87

Current Year Thousand Dollars

Year	Direct Billings		Taxation			Conditional Grants		Fees & Charges		Other Revenues (Est Prop Tax & Uncon Grts)	Total Operating Revenues
	Water	Sewer	Special Area Rates	Other Charges on Tax Bills: Sewer & Water Service Charges	Other Charges on Tax Bills: Connection Charges	Ontario	Canada	Other Municipalities	Fees, Svc Charges & Donations		
Amprior											
78	193	37							6	23	260
83	344	68							23	(48)	386
84	356	79							25	(83)	377
85	369	82							26	37	514
86	389	90							29	(17)	492
87	437	119							29	(113)	473